Upgrading Routers from Version 7-10.*xx* to Version 11.0

Bay Networks

Bay Networks

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About This Guide

If you are responsible for upgrading Bay Networks™ router software from
Version 7-10.*xx* to Version 11.0, you need to read this guide. Refer to this guide
for

- An overview of the router upgrade process and a summary of router upgrade
  tasks (Chapter 1)

- Router upgrade prerequisites and initial upgrade preparations (Chapter 2)

- Instructions for installing Site Manager 5.0 and Router Software Version 11.0
  files (Chapter 3)

- Instructions for transferring customized image files to the router (Chapter 4)

- Instructions for upgrading Boot and Diagnostic PROMs and configuration
  files (Chapter 5)

- Examples that show you how to upgrade various Version 7-10.*xx* routers to
  Version 11.0 (Appendix A)

- Configuration-specific issues affecting router upgrades (Appendix B)

- Instructions for upgrading the DCM software image in AN and ANH routers
  (Appendix C)

- Instructions for upgrading router software using Quick2Config (Appendix D)

Audience

Written for system and network managers, this guide assumes that

- You have a working knowledge of Bay Networks router software, Site
  Manager, and the Technician Interface.

- You have experience managing and configuring Bay Networks routers.

Before You Begin

Before using this guide, you must complete the following procedures:

- Ensure that your router is currently running a version of Bay Networks 7-10.*xx* router software. Also, be sure that you are running Bay Networks Site Manager Version 1.*xx* or later.

- Ensure that the router you want to upgrade meets Version 11.0 hardware and Flash free-space prerequisites. If you need help meeting prerequisites, contact the Bay Networks Technical Response Center in your area.

- Install the router hardware.

  For instructions, refer to one of the following guides:

  -- Installing and Maintaining BN Routers

  -- Installing and Maintaining ASN Routers and BNX Platforms

  -- Installing and Starting BayStack AN Routers

  -- Installing and Starting 8-Port BayStack ANH Systems

  -- Installing and Maintaining FN, LN, CN, AFN, and ALN Routers

Conventions

angle brackets (< >)	Indicate that you choose the text to enter based on the description inside the brackets. Do not type the brackets when entering the command. Example: if command syntax is **ping** *<ip_address>*, you enter **ping 192.32.10.12**
bold text	Indicates text that you need to enter, command names, and buttons in menu paths. Example: Enter **wfsm &**
	Example: Use the **dinfo** command.
	Example: ATM DXI > Interfaces > **PVCs** identifies the PVCs button in the window that appears when you select the Interfaces option from the ATM DXI menu.
brackets ([ ])	Indicate optional elements. You can choose none, one, or all of the options.

ellipsis points	Horizontal (. . .) and vertical (⋮) ellipsis points indicate omitted information.
italic text	Indicates variable values in command syntax descriptions, new terms, file and directory names, and book titles.
quotation marks (" ")	Indicate the title of a chapter or section within a book.
screen text	Indicates data that appears on the screen. Example: `Set Bay Networks Trap Monitor Filters`
separator (>)	Separates menu and option names in instructions and internal pin-to-pin wire connections. Example: Protocols > AppleTalk identifies the AppleTalk option in the Protocols menu. Example: Pin 7 > 19 > 20
vertical line (|)	Indicates that you enter only one of the parts of the command. The vertical line separates choices. Do not type the vertical line when entering the command. Example: If the command syntax is **show at routes** | **nets**, you enter either **show at routes** or **show at nets**, but not both.

Acronyms

AFN	Access Feeder Node
ALN	Access Link Node
BOOTP	Bootstrap Protocol
CPU	Central Processing Unit
DCE	Data Circuit-terminating Equipment
DTE	Data Terminal Equipment
FTP	File Transfer Protocol
HDLC	high-level data link control
HSSI	high-speed serial interface
IP	Internet Protocol
IPX	Internet Packet Exchange
LAN	local area network

MAC	media access control
MIB	Management Information Base
OSPF	Open Shortest Path First
PPP	Point-to-Point Protocol
PPX	Parallel Packet Express
PROM	Programmable Read-Only Memory
RAM	random-access memory
RIP	Routing Information Protocol
SIMM	Single In-line Memory Module
SPEX-HS	Stack Packet Exchange-Hot-Swaps
TFTP	Trivial File Transfer Protocol

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Sydney, Australia	(612) 9927-8800	(612) 9927-8811
Tokyo, Japan	(81) 3-5402-0180	(81) 3-5402-0173

Chapter 1
Router Upgrade Overview

This chapter describes the router upgrade process, summarizes the tasks that make up the router upgrade process, and provides a checklist of important guidelines and tips for upgrading routers.

Router Upgrade Process

The process for upgrading routers from Version 7-10.*xx* to Version 11.0 consists of four separate phases as depicted in Figure 1-1. Each phase includes a series of tasks that you must perform. Complete each task by following its subordinate procedures and numbered steps.

The router upgrade process applies to the following Bay Networks routers:

- Access Feeder Node (AFN®) (with Flash)
- Access Link Node (LN®)
- Access Node (AN®)
- BayStack™ Access Node
- Access Node Hub (ANH™)
- BayStack Acess Node Hub
- Access Stack Node (ASN™)
- Backbone Concentrator Node (BCN®)
- Backbone Link Node (BLN®)
- Concentrator Node (CN®)
- Feeder Node (FN®)

Phase 1:
Preparing to Upgrade

- Verify upgrade prerequisites
- Satisfy startup requirements
- Inspect your upgrade kit
- Review configuration-specific issues

Phase 2:
Starting the Upgrade

- Install Site Manager Version 5.0
- Install Router Software Version 11.0
- Customize router software image
- Backup existing router software image and configuration file

Phase 3:
Continuing the Upgrade

- Prepare the router to accept router software image
- Transfer a customized software image to the router

Phase 4:
Completing the Upgrade

- Upgrade PROMs
- Boot the router with the customized software image
- Upgrade configuration files
- Upgrade Frame Relay circuits (optional)
- Transfer script files to the router

UP70001A

Figure 1-1.   Router Upgrade Process

Router Upgrade Task Summary

Table 1-1 summarizes the tasks that make up the router upgrade process. Refer to this table when you need to find information about a specific upgrade topic quickly.

Table 1-1. **Router Upgrade Task Summary**

To Do This	Refer to Chapter
Satisfy startup requirements	2, Task 1
Inspect your upgrade kit to ensure that it contains the requisite router and Site Manager upgrade components. (Refer to Table 2-4.)	2, Task 2
Review configuration-specific issues affecting router software upgrades	3, Task 3
Upgrade the Distinct TCP/IP stack (or WinSock-compatible TCP/IP stack) and Site Manager on a PC Upgrade Site Manager on a UNIX workstation.	3, Task 1
Install the router software on your PC or UNIX workstation: 1. Load the router software from CD-ROM onto your PC or UNIX workstation. 2. Load the router software into the Image Builder.	3, Task 2
Customize the Version 11.0 router software image by removing nonessential files.	3, Task 3
Back up Version 7-10.*xx* software image and *config* files to ensure that you can restore router operation in case the router malfunctions during the upgrade process.	3, Task 4
Preparing the router to receive a new software image: • Prepare a router with one Flash card • Prepare a router configured for Netboot • Prepare a router with multiple Flash cards	4, Task 1
Transfer a customized image to the router	4, Task 2
Upgrade Boot and Diagnostic PROMs in the router: 1. Determine whether you need to upgrade Boot and Diagnostic PROMs in your router. 2. Determine the current PROM version. 3. Methods for upgrading PROMs 4. Upgrade and verify PROMs. 5. Upgrade PROMs in a router from a remote site.	5, Task 1

(continued)

Table 1-1. **Router Upgrade Task Summary** *(continued)*

To Do This	Refer to Chapter
Boot the router with your customized software image: 1. Prepare the router to receive a customized software image. 2. Transfer a new software image to the router. 3. Boot the router with the customized software image.	5, Task 2
Upgrade your existing Version 7.*xx*, 8.*xx* or 9.0*x* configuration files to Version 11.0: • Booting the 7-10.*xx* configuration file • Saving the configuration file in dynamic mode • Rebooting the router with a new configuration file	5, Task 3
Delete and reconfigure interfaces on which Frame Relay was configured.	5, Task 4
Transfer selected Version 11.0 Technician Interface script files from your Site Manager PC or workstation to a router.	5, Task 5

Router Upgrade Checklist

Review the following items in this checklist before you begin the router upgrade process:

1. **Check your hardware requirements, the amount of contiguous free space on your Flash volume, and the version of your Boot PROM.**

    Refer to "Router Upgrade Prerequisites" in Chapter 2.

2. **Identify the version of router software you are currently running. You should be running Router Software Version 7-10.*xx*.**

    If you plan to run RMON on a version 11.0 AN or ANH router, you must first upgrade the DCM software image version to 1.4. For instructions on upgrading the DCM software image, refer to Appendix C.

3. **Identify the hardware configuration of the router you want to upgrade (router model, link modules, and slot assignments for link modules).**

4. **Gather the manuals you will need to refer to during the router upgrade process (<u>refer to Table 1-2.</u>) This manual provides only general guidelines for completing the router upgrade tasks.**

Table 1-2.   Reference Books for Upgrading Routers

To Do This	Refer to These Books
Upgrade the Distinct TCP/IP Stack and Site Manager on a PC*	*Quick-Starting Routers and BNX Platforms; Distinct TCP/IP for Microsoft Windows Run Time Installation and Configuration Guide*
Upgrade Site Manager on a UNIX workstation	*Quick-Starting Routers and BNX Platforms*
Install router software on a PC or UNIX workstation	*Modifying Software Images for Routers*
Customize the router software image	*Modifying Software Images for Routers; Managing Routers and BNX Platforms*
Transfer your customized image to the router	*Managing Routers and BNX Platforms*
Boot the router with a customized image	*Modifying Software Images for Routers*
Upgrade Boot or Diagnostic PROMs in a router	*Using Technician Interface Software*
Upgrade configuration files on the router	*Configuring Routers*

*. If you use a Windows Socket-supported TCP/IP stack other than Distinct TCP/IP Version 3.31 to support Site Manager, refer to the user documentation supplied by the manufacturer of the TCP/IP stack for installation instructions.

5. **Review the configuration-specific issues that affect router upgrades to determine whether they apply to your current situation.**

    Appendix B describes configuration-specific issues affecting router upgrades. If you are upgrading routers in an environment that includes any of the situations shown in , follow the instructions on the pages indicated.

Table 1-3.   Configuration-specific Situations Affecting Router Upgrades

Configuration-specific Situation	Refer to Page
Routers passing X.25 certification	B-1
Standard Point-to-Point connections over synchronous lines	B-3
Switched Services enhancements and compatibility	B-4
PPP multiline migration	B-6

Chapter 2
Preparing to Upgrade

This chapter describes prerequisites for upgrading routers from Version 7-10.*xx* to Version 11.0. It also provides helpful tips for upgrading routers and describes initial router upgrade preparations.

Router Upgrade Prerequisites

Do not begin the router upgrade process until you verify that the router you want to upgrade meets the prerequisites described in this chapter for

- Minimal hardware and configuration requirements
- Contiguous free space on a Flash volume

➡ **Note:** If you need help meeting the hardware prerequisites of the Version 11.0 router software upgrade procedure, contact the Bay Networks Technical Response Center in your area.

Minimum Hardware and Configuration Requirements

Before you upgrade to Router Software Version 11.0, perform the following steps to ensure that your router meets all minimum hardware configuration and revision level requirements.

1. **Check the Flash memory requirements for the router you are upgrading.**

   Ensure that you have adequate Flash memory to accommodate the Version 11.0 router software.

2. **Complete any planned (optional) upgrade from 2-MB Flash to 4-MB or 8-MB Flash support on your router.**

This procedure includes a Boot PROM upgrade for the processor module in which your Flash card resides. For example, if you have a VME-based router, you upgrade your Flash card on a System Controller 2 (SYSCON-II) card. If you have a BN router, you upgrade your Flash card in each of your FRE or FRE-2 processor modules.

Router Software Version 11.0 supports 8-MB Flash capability on BN and ASN routers. Before you upgrade your 8-MB Flash card with Router Software Version 11.0, make sure that you upgrade your Boot PROM to Version 8.00 or later.

Support for 4-MB Flash capability began with Version 8.00 of the router software.

Caution: The version of the Boot PROM you use to support 4-MB Flash cards in the router also has significant implications for router software image management within your network. (The router software image names for Version 8.10 and later have changed.) More detailed information on Boot PROMs and the new image-naming conventions follow later in this chapter.

3. **Determine whether any other new router hardware depends on software or PROM upgrades to work properly.**

   For example, an ASN SPEX™-HS requires a Diagnostic PROM upgrade to Version 2.16 before you install the new backplane module. Without the Diagnostic PROM upgrade, the ASN router will fail to pass diagnostics and will fail to boot.

4. **Complete any planned physical installations of the following router hardware:**

   • Spare FRE®/FRE-2 controllers in your Version 7-10.*xx* BLN, BLN-2, or BCN router

   • Additional/spare ASNs on your Version 8.*xx*, 9.*xx,* or 10.0 ASN router

   • New link modules in the router

Contiguous Free Space on a Flash Volume

You must determine the amount of contiguous free space required on a Flash card to accommodate your customized Version 11.0 router software image and configuration files. The amount of contiguous free space available on the target Flash volume must be greater than the combined size of your customized Version 11.0 image and associated files (such as *config*, *ti.cfg*, *install.bat*, and, if appropriate, a Version 11.0 PROM image).

To obtain the amount of contiguous free space available on a selected volume, see the fields at the bottom of the Router Files Manager window in Site Manager (Table 2-1).

Table 2-1.   Determining Contiguous Free Space on Flash Card from Router Files Manager Window

Field	Meaning
Total SIze	Total number of bytes (used and unused) on the volume.
Available Free Space	Number of unused bytes on the volume.
Contiguous Free Space	Number of unused bytes in the largest block available on the volume. This space is actual usable memory.

Router Upgrade Hints and Tips

The following sections offer helpful hints and tips for upgrading router software from Version 7-10.*xx* to Version 11.0. Review these sections before beginning the upgrade process.

- "Backing Up Your Files"

- "Compacting a Flash Memory Card"

- "Verifying Router Software Image Names"

- "Verifying Current PROM Version"

- "Maintaining Consistent Files in Multiple Memory Cards"

- "Responding to a Failed prom Command"

Backing Up Your Files

Store backup copies of the configuration files on the Site Manager workstation. To prevent confusion, use a log to record the location, name, and purpose of each configuration file you back up. Organizing and naming the backup files on the Site Manager workstation will also help you prevent mix-ups.

Caution: Always back up a file before deleting it. This includes configuration and log files. And always back up the current log file on the Site Manager workstation before clearing it; you may want to refer to it later to troubleshoot a problem.

Compacting a Flash Memory Card

You compact a Flash memory card to free up space taken by deleted files. This ensures that the Flash card has enough contiguous free space to accommodate the new Version 11.0 software image.

You should compact your Flash card during "off-peak" hours if possible, due to resource requirements to perform the compaction (FRE memory and CPU cycles). Do not remove a Flash card, hot-swap a slot, or reset a slot during a Flash card compaction as the Flash card will become corrupted, causing loss of data.

Note: A Flash compaction operation may take up to 12 minutes on an AN router. Do not power cycle the AN router during compaction. If you attempt to power cycle the AN router, the Flash card will be corrupted and will not boot.

Compacting a Flash Memory Card from Site Manager

To compact a Flash memory card from Site Manager, the Compact option in the File Manager Commands menu.

Compacting a Flash Memory Card from the Technician Interface

To compact a Flash memory card from the Technician Interface, enter the **compact** *<volume>*: command. For example, enter **compact 2:** to compact the files in Volume 2. The file system copies all of the files to memory except for the deleted ones, erases the memory card, and copies the files back to the memory card.

Viewing the Status of the Flash Memory Card

To view the status of a memory card, display its directory. The directory display shows the amount of "available free space" or "free space," and the amount of "contiguous free space."

The "available free space" or "free space" is the total number of bytes of unused space and bytes of space used by files that are deleted.

In order for the memory card to accommodate a file, the file's size must be less than or equal to the "contiguous free space." The "contiguous free space" is the number of bytes of unused space.

If the file you want to store is less than the "available free space," but more than the "contiguous free space," compact the existing files first. When you finish compacting files on a memory card, the "contiguous free space" matches the "available free space."

Verifying Router Software Image Names on the Router

Make sure that the router software image on the router is compatible with the type of router you are using. A router software image is a group of executable files that contains the operating system and protocols on your network with a Bay Networks router. The type of software image a router uses depends on the particular Bay Networks router you are trying to boot.

Starting with Version 8.10 of the router software, Bay Networks implemented a new naming convention for router software image files in all routers except the FN, ALN, LN, and CN. The new naming convention provides the following benefits:

- Simplifies how you manage router software image files on your Site Manager workstation

- Reduces the complexity of performing future upgrades in a network containing different routers

Table 2-2 lists the Version 11.0 router software images for each router platform and the device (Flash card or SIMMs) on which the image runs. If you are using a lower version of Bay Networks router software, refer to the appropriate version of this guide for details on router software images.

Table 2-2.   Router Software Image Types

Router	Router Software Image	Device That Image Runs On
ARE	bn.exe	Flash card
5780 ARE	s5000.exe	Flash card
AFN (Flash)	afn.exe	Flash card
IN	in.exe	Flash card
ASN	asn.exe	Flash card
BLN	bn.exe	Flash card
BCN	bn.exe	Flash card
AN	an.exe	Flash Single Inline Memory Modules (SIMMs)
BayStack AN	an.exe	Flash card
CN, FN, LN (VME)	ace.out	Flash card

Refer to *Modifying Software Images for Routers* for detailed information about software images.

Verifying Current PROM Version

You can use Site Manager or the Technician Interface to determine the current version of Boot and Diagnostic PROM images currently running in your router.

Table 2-3 lists the Version 11.0 Boot and Diagnostic PROM filenames and associated revision numbers for the various router platforms.

Table 2-3. **Version 11.0 Boot and Diagnostic PROM Revisions**

Router Platform	Diagnostic PROM Filename	Diagnostic PROM Revision Number	Boot PROM Filename	Boot PROM Revision Number
AN	andiag.exe	v7.22	anboot.exe	rel/9.00
ARE	arediag.ppc	v1.12	areboot.ppc	rel/9.01
BN	frediag.exe	v4.10	freboot.exe	rel/8.10
ASN	asndiag.exe	v2.18	asnboot.exe	rel/10.00
LN/CN	No Diagnostic PROM shipped		vmeboot.exe	rel/8.11
AFN	v3.04 combination boot and diagnostic PROM		Not applicable	Not applicable

See Chapter 5 "Upgrading PROMs and Configuration Files" for instructions on how to verify the current PROM version on your router.

Maintaining Consistent Files in Multiple Memory Cards

If the router uses multiple memory cards, make sure that each file is consistent in each memory card designated for storing files of that type. For example, if you make a change to a router software image or configuration file, save the file to each memory card that contains the same files.

To make sure that the files of the same name are consistent on multiple memory cards, display the directory of each card and compare the sizes of each file.

Refer to *Troubleshooting Routers* for more information.

Responding to a Failed prom Command

> **Caution:** If the Technician Interface **prom** command fails, do not reboot. Instead, call the Bay Networks Technical Response Center.

If you reboot after the prom command fails, a Bay Networks representative must reinsert new PROMs (programmable, read-only memory chips) on the board and rewrite the PROM software to them before the router can recover.

Initial Upgrade Preparations

Initial preparation for upgrading router software from Version 7-10.*xx* to Version 11.0 consists of the following tasks, each of which is described in greater detail in this chapter.

- Task 1: Satisfying Startup Requirements

- Task 2: Inspecting your Upgrade Kit

- Task 3: Reviewing Configuration-specific Issues Affecting Router Software Upgrades

Task 1: Satisfying Startup Requirements

Before you begin the router upgrade procedure, ensure that

- You identify the version of router software you are currently running. You should be running Router Software Version 7-10.*xx*.

  Also, if you plan to run RMON on a Version 11.0 AN or ANH router, you must first upgrade the DCM software image to Version 1.4; DCM software images earlier than Version 1.4 cannot be used with Router Software Version 11.0.

- You identify the hardware configuration of the router you want to upgrade (router model, link modules, and slot assignments for link modules).

- You have considered your memory requirements carefully. Based on the number of protocols installed on your router, you may require additional memory to run these protocols.

If you have questions regarding memory requirements, contact the Bay Networks Technical Response Center in your area.

- You have a working knowledge of the operating system and the windowing software on the UNIX workstation or PC you will use to run Site Manager software.

- You have a 4-MB or 8-MB Flash card (depending on your router type) on which to store the Version 11.0 router software image and associated files. A 2-MB Flash card will no longer accommodate the Version 11.0 router software image and associated files.

- You have considered minimum hardware revisions (for example, a link module with hot-swap capability may require a hardware revision for Version 11.0).

- You have read these Bay Networks publications:

    -- *Read Me First: Router Software 11.0 and Site Manager 5.0*

    -- *Release Notes for Router Software Version 11.0*

    -- *Release Notes for Site Manager Software Version 5.0*

    -- *Known Anomalies: Router Software 11.0 and Site Manager 5.0*

Task 2: Inspecting Your Upgrade Kit

Check your upgrade kit to ensure that it contains the Router Software Version 11.0 and Site Manager Version 5.0 upgrade components listed in Table 2-4.

Table 2-4.   Router Software and Site Manager Software Upgrade Components

Component	Software Storage Media and Printed Media	Management Platform
Router Software Version 11.0 includes • Platform-specific Router Software image files • Platform-specific Boot and Diagnostic image files • *config* file • *debug.al* file • *install.bat* file • *ti.cfg* file • *ti_asn.cfg* file (for ASN router only) Site Manager Software Version 5.0 includes • Technician Interface Scripts • Distinct TCP/IP Version 3.31 for Site Manager*	CD-ROM on High Sierra file format	UNIX workstation or Windows/DOS PC
Version 11.0 online documentation library	CD-ROM on High Sierra file format	UNIX workstation or Windows/DOS PC
Version 11.0 upgrade documentation: • Router upgrade document (Version 7-10.*xx* to Version 11.0) • Site Manager Release Notes • Router Software Release Notes • Read Me First (if available) • Known Anomalies	Printed media	UNIX workstation or Windows/DOS PC
Distinct TCP/IP for Microsoft Windows Run TIme Installation and Configuration Guide	Printed media	UNIX workstation or Windows/DOS PC

*. Distinct TCP/IP Version 3.31 is a Windows Sockets (WinSock) compatible TCP/IP application program that ships with Site Manager 5.0. Site Manager uses Distinct TCP/IP software to communicate with Bay Networks routers.

Task 3: Reviewing Configuration-specific Issues Affecting Router Software Upgrades

Depending on the current configuration of your Version 7-10.*xx* router, there may be configuration-specific issues that you need to consider before you begin the upgrade process. If you are upgrading routers in an environment that includes any of the following configuration-specific situations, see Appendix B for detailed information:

- X.25 Certification requirements

- Standard Point-to-Point (PPP) connection guidelines

- Switched Services enhancements and compatibility issues

- PPP multiline migration issues

If none of these situations applies to the router you are upgrading, go to Chapter 3 to begin the router upgrade process.

Chapter 3
Starting the Upgrade:
Upgrading Site Manager and Router Software

This chapter describes how to

- Upgrade Site Manager Version 5.0 and Router Software Version 11.0 files on your PC or UNIX workstation.

- Install the Router Software on a PC or UNIX workstation

- Customize the router software image

- Backup the existing router software image and configuration files

Task 1: Upgrading to Site Manager Version 5.0

➡️ **Note:** You can use Quick2Config instead of Site Manager 5.0 to configure AN, ANH, and ASN routers to support Router Software Version 11.0. For instructions on how to upgrade an AN, ANH, or ASN to Router Software Version 11.0 using Quick2Config, see Appendix D.

This section provides general guidelines for upgrading Site Manager 5.0 software and Distinct TCP/IP for Microsoft Windows on your PC. It also provides general guidelines for upgrading Site Manager on your UNIX workstation. Go to the section you need, as shown in Table 3-1.

Table 3-1.   Upgrading Site Manager on a PC or UNIX Workstation

If you are	Go to section	On page
Using a personal computer (PC)	Upgrading the Distinct TCP/IP Stack and Site Manager on a PC	page 3-2
Using a Sun SPARCstation, IBM RS/6000, or HP 9000	Upgrading Site Manager on a UNIX Workstation	page 3-6

For detailed information about the Distinct product, refer to *Distinct TCP/IP for Microsoft Windows Run Time Installation and Configuration Guide*, the Distinct Corporation documentation supplied with Site Manager. Also, check the Bay Networks *Read Me First* documentation for changes to the installation instructions. For detailed information about installing Site Manager on your PC or workstation, refer to *Quick-Starting Routers and BNX Platforms.*

Upgrading the Distinct TCP/IP Stack and Site Manager on a PC

Site Manager on the PC uses a Windows Socket-compatible TCP/IP stack to communicate across the IP network. Before you can upgrade to Site Manager 5.0 on your PC, you must first upgrade the TCP/IP stack and configure it properly.

Site Manager ships with the Distinct TCP/IP for Microsoft Windows software, Version 3.31, a Distinct Corporation application. Distinct TCP/IP provides an interface between Site Manager and the TCP/IP network. Earlier versions of Distinct TCP/IP will not work with Site Manager 5.0 for the PC.

If you use another Windows Socket-supported TCP/IP stack to support Site Manager, refer to the user documentation supplied by the manufacturer of the TCP/IP stack for installation instructions. You do not have to install Distinct and can go to Step 4 of this procedure. For a complete list of Windows Socket-supported TCP/IP stacks supported by Site Manager 5.0, refer to *Quick-Starting Routers and BNX Platforms.*

Upgrading the Distinct TCP/IP Stack

To upgrade Distinct TCP/IP for Microsoft Windows on your PC:

1. **Prepare information for Distinct installation.**

   The Distinct installation prompts you to provide:

   - Serial number and key code information

   - Network interface card and driver information

   - Network configuration information

   For detailed instructions on preparing for the Distinct installation, refer to *Quick-Starting Routers and BNX Platforms.*

2. **Delete all existing Distinct files.**

   Enter the following command at the DOS prompt:

   del c:\windows\distinct*.*

   c is the name of the hard drive.

➡ **Note:** If the Distinct files and directory are stored in a path other than that indicated in Steps 2 and 3, enter the **del** and **rmdir** commands with the appropriate path.

---

3. **Remove the Distinct directory.**

   Enter the following command at the DOS prompt:

   rmdir c:\windows\distinct

   When you start the Site Manager installation program, the system automatically creates a new directory (*distinct*) into which it installs the Distinct TCP/IP software.

4. **Install the Distinct TCP/IP software.**

   You can install the Distinct TCP/IP software from the Site Manager CD or from a disk. Refer to *Quick-Starting Routers and BNX Platforms* for instructions on installing the Distinct TCP/IP software.

➡️ **Note:** Make sure that you have successfully loaded Distinct before installing Site Manager. If the Distinct installation is unsuccessful, review Appendix C "Trouble Shooting," in the *Distinct TCP/IP for Microsoft Windows Run Time Installation and Configuration Guide*.

5. **Test the Distinct TCP/IP configuration.**

   Use the Distinct Ping function to send an echo request to the router after installing and configuring Distinct TCP/IP. This procedure tests your network and your Distinct configuration.

Upgrading Site Manager

To upgrade Site Manager on your PC:

1. **Check the system requirements.**

   Ensure that your PC complies with the Site Manager Version 5.0 system requirements listed in *Quick-Starting Routers and BNX Platforms.*

2. **Delete the Site Manager state files.**

   Enter the following command:

   del   c:\wf*.sts

   c is the name of the hard drive.

   State files describe the state of the application when you last exited it. Site Manager creates state files for all Site Manager tools you use.

➡️ **Note:** If you do not delete the state files before you install the new version of Site Manager on your PC, Site Manager may not function properly when you restart it.

3. **Install the Site Manager software.**

Site Manager software is distributed on CDs and disks. Refer to the appropriate section in *Quick-Starting Routers and BNX Platforms* for instructions on installing both types of media on your PC.

➡️ **Note:** Do not update the *config.sys* file or copy the driver file to the *c:\etc* directory; you did this when you initially installed Site Manager.
If a window prompts you to choose options that involve adding new icons while you are installing Distinct, select "Do not create any new icon" and click on OK.

---

4. **Start up the Site Manager application from Windows.**

   a. **Select the Site Manager program group.**

   b. **Double-click on the PC/Site Manager icon.**

   The Site Manager window appears (Figure 3-1).
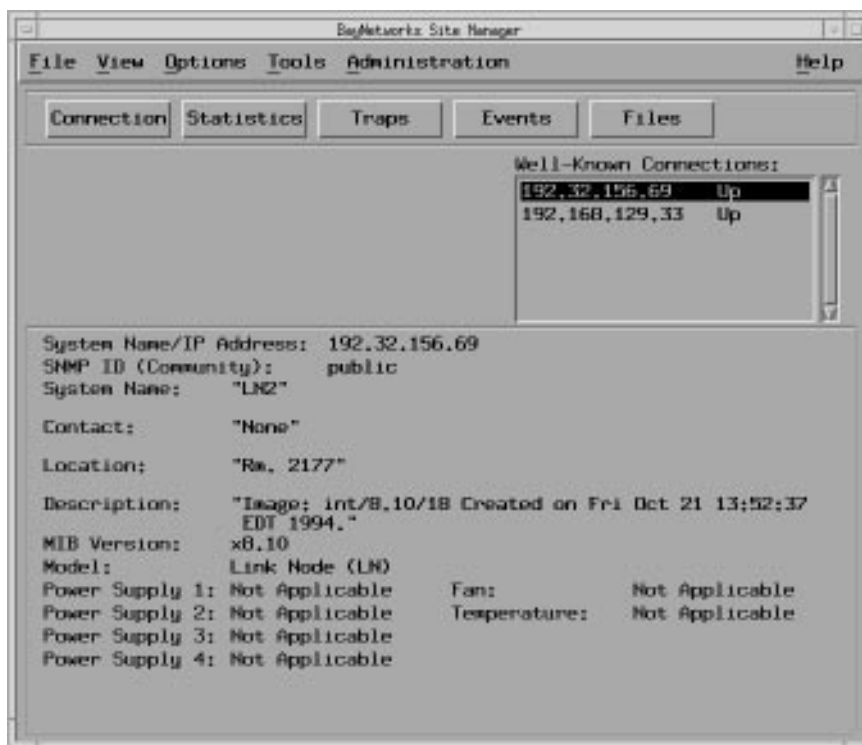
Figure 3-1.　Site Manager Window

After you finish upgrading Site Manager software on your PC, go to Task 2: "Installing the Router Software on a PC or UNIX Workstation."

If you are having problems upgrading Site Manager, refer to *Troubleshooting Routers*.

Upgrading Site Manager on a UNIX Workstation

To upgrade the Site Manager software on a Sun SPARCstation (running SunOS or Solaris OS), IBM RS/6000, or HP 9000 UNIX workstation:

1. **Check system requirements.**

    Ensure that your UNIX workstation complies with the Site Manager Version 5.0 system requirements listed in *Quick-Starting Routers and BNX Platforms*.

2. **Get superuser privileges.**

    Enter the following command at the UNIX prompt:

    su

> **Note:** Exit from the current version of Site Manager before you delete any Site Manager files. Otherwise, the new version of Site Manager will not overwrite all of the current version files.

3. **Delete the Site Manager state files.**

    Enter the following command from the home directory of every user account:

    r m *<home_directory>*/**.wf***

    Site Manager creates state files for all Site Manager tools you use. State files describe the state of the application when you last exited it.

> **Note:** If you do not delete the state files before you install the new version of Site Manager on your workstation, Site Manager may not function properly when you restart it.

4. **Refer to the appropriate section in** *Quick-Starting Routers and BNX Platforms* **to install the Version 5.0 Site Manager software.**

If you are using	See the following section in *Quick-Starting Routers and BNX Platforms*
Sun SPARCstation running SunOS or Solaris	Installing Site Manager on a SPARCstation
IBM RS/6000	Installing Site Manager on an IBM RS/6000
HP 9000	Installing Site Manager on an HP 9000

After you finish upgrading Site Manager on your UNIX workstation, go to Task 2: "Installing the Router Software on a PC or UNIX Workstation."

Task 2: Installing the Router Software on a PC or UNIX Workstation

This section describes how to install Router Software Version 11.0 on your Site Manager Software Version 5.0 PC or UNIX workstation. For more detailed information about installing the router software, refer to *Modifying Software Images for Routers*.

Loading Router Software onto a PC or UNIX Workstation

Bay Networks router software is available on CD-ROM only. The steps that you follow to load the router software from CD-ROM depend on whether you use a PC or a UNIX workstation. Table 3-2 outlines the steps that you must perform to load the router software from CD-ROM to your PC or UNIX workstation.

Table 3-2.   Loading the Router Software from CD-ROM to a PC or Workstation

Step	On a PC	On a UNIX Workstation	
1	Insert the CD-ROM into CD-ROM drive.	Insert the CD-ROM into your CD-ROM drive.	
2	Bring up Windows.	If you have not already created a CD-ROM mountpoint, log in as *root* and create a root-level directory. For example, enter **mkdir** /**cdrom**	
3	Double-click on the File Manager icon.	Mount the CD-ROM drive.	
		SunOS on a SPARCstation	**Solaris on a SPARCstation**
		Enter this command: **mount -r -t hsfs** /**dev**/*<device>* /**cdrom**	Enter this command: **mount -F hsfs -o ro** /**dev**/*<device>* /**cdrom**
		IBM RS/6000	**HP 9000**
		Enter this command: **mount -o ro -v cdrfs** /**dev**/*<device>* /**cdrom**	Enter this command: **mount -r /dev/***<device>* /**cdrom**
4	Click on the CD-ROM drive icon in the File Manager window.	Change directories by entering **cd /cdrom**	

(continued)

Table 3-2.   Loading the Router Software from CD-ROM to a PC or Workstation *(continued)*

Step	On a PC	On a UNIX Workstation
5	Click on the *rtr_xxx* directory, where *xxx* is the router software version. For example, for Version 11.0, you would click on the *rtr_1100* directory.	Run the script to load the router software using one of the following commands: On a SPARCstation, enter **./COPY.SH** On an IBM RS/6000, enter **./copy.sh** On an HP 9000, enter **./COPY.SH\;1**
6	Click on the directory for your router platform.	During the load procedure, you must specify the following: • The directory where you want to load the router software • The router platform: AFN (Flash), AN, ASN, BN, or VME The system then loads the software for the platform you selected.
7	Select **File > Copy.**	
8	Specify the destination directory: **wf***xxx* *xxx* is the version of the router software.	
9	Click on OK. The system loads the router software for the platform you selected. When the process is complete, you can load the router software for any of the other platforms by repeating Steps 6-9.	

You can now load the router software into the Image Builder, as described in the next section.

Loading Router Software into the Image Builder

After you have loaded the router software from CD-ROM onto the local hard drive of your UNIX workstation or PC, you must load the router software into the Image Builder. You use the Image Builder to customize the router software image to fit your router configuration requirements.

To load the router software into the Image Builder:

1. **Start Image Builder.**

   Select Tool > Image Builder from the main Site Manager window.

   The Image Builder window opens.

2. **Select File** > **Open from the Image Builder window.**

   The Open window appears (Figure 3-2).
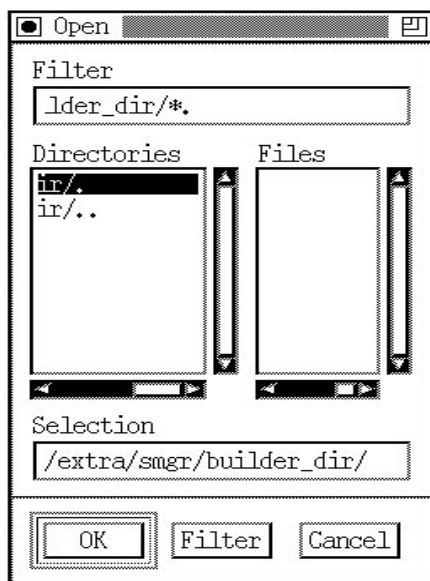
Figure 3-2.   Open Window

3. **Select the directory and filename of the router software image that you want to open. Then click on OK.**

The directory and filename that you specify depend on the following:

- The computer platform (UNIX workstation or PC)
- The router platform

If you loaded the router software from CD-ROM onto a UNIX workstation, the system stored the software image in the directory for the appropriate router platform. For example, you would find the image *ace.out* for the VME platform in the *vme* directory.

If you loaded the router software onto a PC, the system stored the software image in the directory you created for the router software (*wf**xxx*).

After you enter the pathname of the image, the Image Builder window lists the current components of the Version 11.0 router software image in the Image Builder window (Figure 3-3).
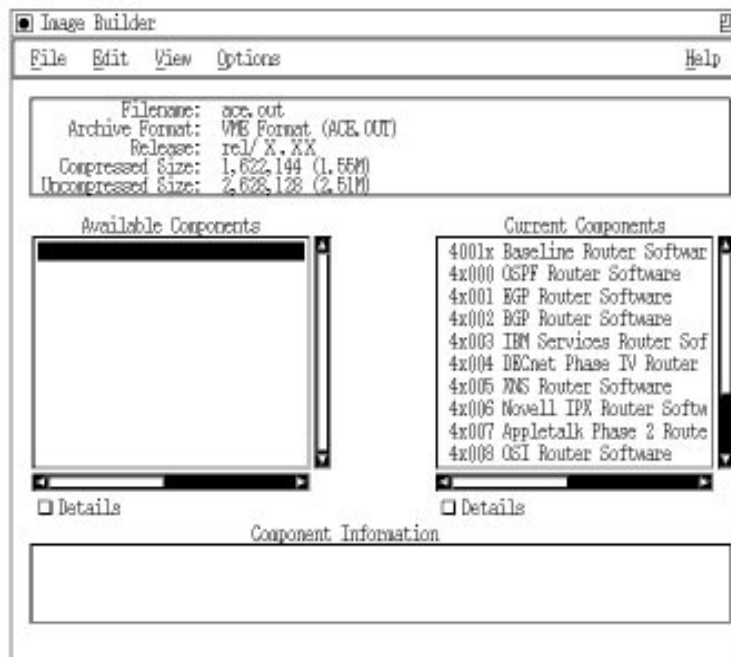
Figure 3-3.   Image Builder Window with Current Components

Chapter 4
Continuing the Upgrade:
Transferring Customized Files to the Router

This chapter describes how to

- Prepare the router to receive a new software image

- Transfer your customized image to the router

Task 1: Preparing the Router to Receive a New Software Image

Before you can transfer a customized image to the router you want to upgrade, you must first prepare the router's Flash card or Flash SIMM to receive a customized image and a configuration file. Refer to the following table for further instructions.

If the number of Flash memory cards in the router is	Refer to This Section
1	Preparing Routers with One Flash Card or Preparing Routers Configured for Netboot
Greater than 1	Preparing a Router with Multiple Flash Cards
Greater than 1 (and the cards contain files for an earlier release of the router software)	Using Flash Cards from Previous Releases

➡️ **Note:** AFN routers support only one Flash card. AN routers support only one SIMM.

Preparing Routers with One Flash Card

To prepare a router equipped with one Flash card to accept a customized software image:

1. **Verify that you have backed up the router's Version 7-10.***xx* **boot image to your Site Manager workstation.**

   You saved a copy of the Version 7-10.*xx* boot image when you backed up the router software image and configuration files in Chapter 3.

2. **Load all the .***str* **files from the router's Flash card into the router's memory by entering the following command from the Technician Interface:**

   string load

   It is important that you load the .str files into the router's memory before deleting the previous router software image (Step 3). If you fail to load the .*str* files and then delete the previous router software image from the router's Flash card, the software image running in memory may need to pull some .*str* files from the image that was previously stored on the Flash. However, that image no longer exits or has been partially updated to a new software image.

3. **Delete the current router software image (for example,** *an.exe, asn.exe,* **or** *bn.exe)* **from the router's Flash card by selecting Commands** > **Delete in the File Manager window.**

   Perform this step if the router is an AN and your network is not configured to perform a Netboot operation on an AN router.

4. **Compact the router's Flash card.**

   Select Commands > Compact from the Router Files Manager window.

   A message appears asking whether you want to proceed with the file compaction.

You compact the Flash card to ensure that it has enough contiguous free space to accommodate the Version 11.0 software image.

→ **Note:** The AN may require approximately 12 minutes to finish compacting its Flash file space.

5. **Click on Yes in the message window.**

An hourglass appears for the duration of the file compaction. After several minutes, a window displays the following message, where *x* is the volume you are compacting:

```
Last file system command, "compact x:" finished successfully.
```

Go to "Transferring a Customized Image to the Router."

Preparing Routers Configured for Netboot

If you have an AN or ASN router with one Flash card and you have configured your router to boot off the network (using Netboot or Directed Netboot), consider the following:

• Do not delete the Version 7-10.*xx* boot image from the router's Flash card.

You may need a backup boot image in case the new boot image is corrupted.

• Do not compact the contents of the card.

• Netboot the AN router from a customized Version 11.0 router software image residing on a BOOTP server in your network.

With this approach, the Version 11.0 image runs in active memory on the router, but the Version 7-10.*xx* image remains available on the router's Flash card as a backup.

After you verify that the Netboot operation ran successfully, you might decide to install the Version 11.0 image on the AN Flash SIMM, ASN (Flash), or BayStack™ Flash card. You do this to ensure that the router software version stored in the router's memory is compatible with the one stored on the AN Flash SIMM, ASN Flash, or BayStack Flash card. By installing the Version 11.0 router software image onto the SIMM Flash or a Flash card, you will have a backup version of the 11.0 image in case the Netboot operation fails.

Before you install the Version 11.0 image on Flash SIMM or Flash card, follow these steps:

1. **Delete the Version 7-10.*xx* image from the AN Flash SIMM.**

2. **Compact the contents of the Flash SIMM.**

3. **Use TFTP to transfer your customized Version 11.0 image, *an.exe*, from your Site Manager workstation to the Flash SIMM volume on the router.**

Refer to *Connecting BayStack AN and ANH Systems to a Network* or *Connecting ASN Routers and BNX Platforms to a Network* for detailed information on how to perform a Netboot operation on a router.

Preparing a Router with Multiple Flash Cards

Bay Networks recommends that you use at least two Flash cards in any router designed to accommodate multiple Flash cards.

When you use two Flash cards in a router, you can keep the active (Version 7-10.*xx*) software image on one Flash card while you use the TFTP command in Site Manager to transfer the new (Version 11.0) image to a backup Flash card designated for the upgrade. Once you successfully install and verify the new router software image, you can replace the earlier version image.

To prepare a router equipped with multiple Flash cards to receive a customized software image:

1. **Insert a Flash card into your router.**

   This is the backup Flash card onto which you will store the Version 11.0 router software image and associated files.

2. **Back up the contents of your Flash card to your Site Manager workstation.**

   You do this as a safeguard in case your Flash card malfunctions.

3. **Reformat the Flash card, making sure that the volume or slot number in which the Flash card resides is correct.**

   Select Commands > Format from the Router Files Manager window.

   This operation deletes all files from the Flash card and compacts its contents.

4. **Copy the Version 11.0 router image files from your Site Manager workstation to the Flash card you just formatted.**

Now your backup Flash card is blank and is ready to accept the Version 11.0 image and associated files.

Go to "Transferring a Customized Image to the Router" to copy the image to the router.

Using Flash Cards from Previous Releases

All Bay Networks routers running Software Versions 7.60 to 8.10, and AFNs running Version 7.5*x,* write to Flash cards using a 68-space file format. Bay Networks BNs (BLN, BLN-2, and BCN) running Version 7.5*x* write to Flash cards using a 61-space file format.

Table 4-1 shows which Bay Networks routers can read, write, and boot from the different file format types.

Table 4-1. **Flash Volume File Compatibility between Routers Running Different Versions of Router Software**

| Files Written to Flash Memory by: | Router Capabilities to Read, Write, or Boot from Files | | | |
	FNs, LNs, CNs, and BNs Running 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, or 9.00	AFNs Running 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00	BNs Running 7.5*x*	AFNs Running 7.5*x*, 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00, 10.0
Any router running 7.60, 7.7*x*, 7.80, 8.0*x*, 8.10, 9.00	Read, Write, Boot	Read, Write, Boot	Read, Boot	Read, Write, Boot
AFN running 7.5*x*	Read, Write, Boot	Read, Write, Boot	Read, Boot	Read, Write, Boot
BN running 7.5*x*	Read, Write, Boot	None	Read, Write, Boot	None

When a BN running Router Software Version 8.10 or 9.00 reads a Flash card that contains files written by a BN running Router Software Version 7.5*x,* and you enter the **dinfo** command at the Technician Interface prompt, the display indicates that the volume is corrupted. If you request a directory of the volume's contents (using the **dir** command), the display indicates that the contiguous free space is 0 (zero). You can, however, read and boot from the files.

You must convert the contents of a Flash card to a format compatible with the router software currently running on a BN router. You do this by copying the files to the router's memory, reformatting the Flash card, and copying the files in memory back to the Flash card. Follow these steps:

1. **Insert the Flash card into the BN router.**

2. **Display the Flash card's directory.**

   Select Commands > Directory from the Router Files Manager window.

   If the available free space and contiguous free space are equal, you cannot compact the Flash card at this time; go to Step 3. Otherwise, go to Step 5.

3. **Fragment the Flash card volume so you can compact it.**

   Copy the smallest file on the Flash card to the same volume, giving it a new filename. Select Command > Copy from the Router Files Manager.

4. **Delete the original file you created in Step 3.**

   This fragments the volume, dividing the contiguous space on the Flash card. This allows you to compact the contents of the Flash card.

5. **Compact the contents of the Flash card**

   Select Commands > Compact from the Router Files Manager.

   The router copies and rewrites all of the files in the correct format for the software that is currently running.

Task 2: Transferring a Customized Image to the Router

The Router Files Manager allows you to transfer a customized image file between your Site Manager workstation and the router you want to upgrade using the TFTP command.

Before attempting to transfer a customized image to the router, consider the following conditions:

- If the router you want to upgrade has only one Flash card and you have not updated the router's Boot PROM for Version 8.10 or 9.*xx,* you must rename your customized Version 11.0 image to *boot.exe* before attempting to transfer that image to the router.

- If the router you want to upgrade has multiple Flash cards and you have not updated the router's Boot PROM for Version 8.10 or 9.*xx,* you must

    a. **Transfer the customized image (for example, *asn.exe* or *bn.exe*) to an alternate Flash volume on the router.**

    b. **Boot the Version 11.0 image on the router by performing a "named boot" from the Technician Interface prompt, as follows:**

    <slot**>:***bn.exe* <slot>:*config*

    <slot> is the slot containing the image name *bn.exe* and the original configuration file*, config.*

➡️ **Note:** We recommend that you ping the router before you transfer the customized image file to it. For instructions on how to ping a router, refer to Managing Routers.

To transfer a customized image file to the router you want to upgrade:

1. **Choose the router to which you want to transfer the image file.**

    a. **Select Options > Router Connection in the Router Files Manager window (Figure 4-1).**
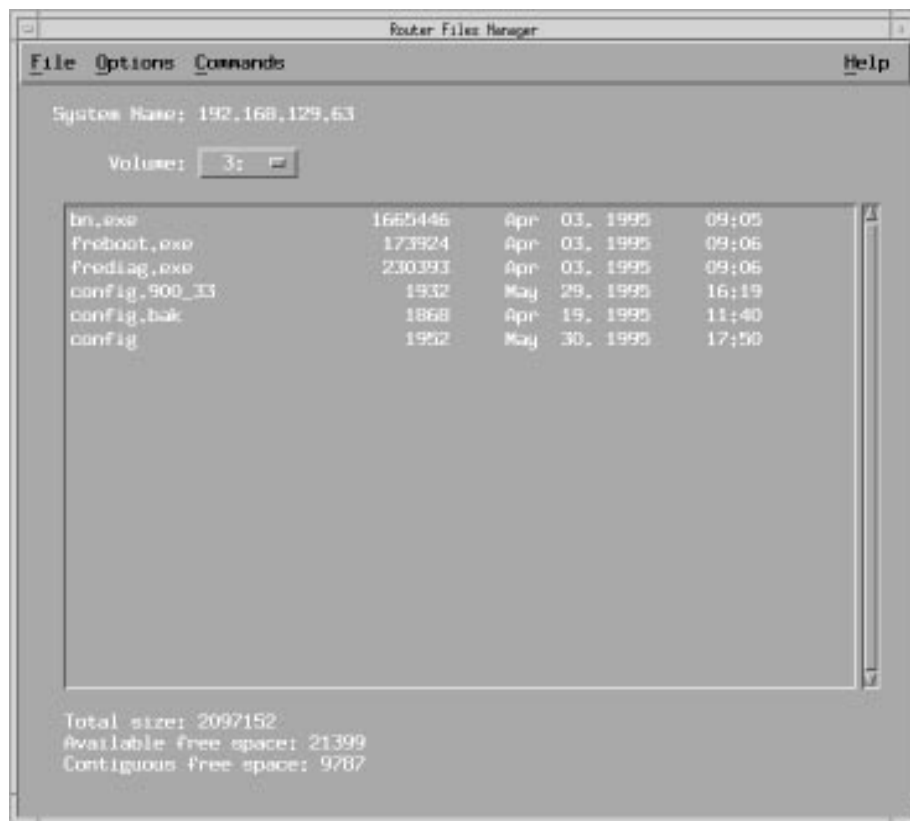
Figure 4-1.   Router Files Manager Window

The Router Connection Options window appears (Figure 4-2).

b.   In the Node Name/IP Address field, enter the IP address of the router. Then click on OK.
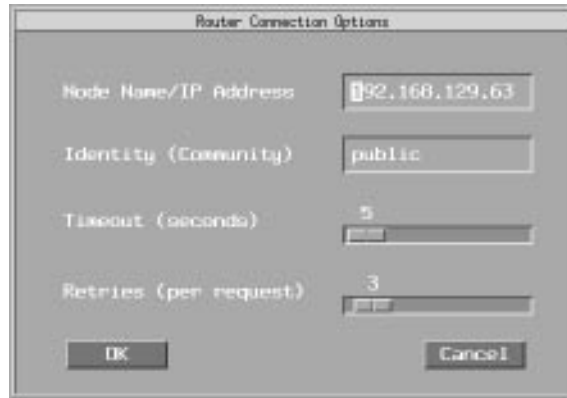
Figure 4-2.   Router Connection Options Window

2. **Verify space on the destination volume.**

   Make sure that the router destination volume has enough space available for the file you want to transfer. The Router Files Manager window shows the available free space and contiguous free space on the router.

   For a DOS file system, refer to the number of bytes displayed for available free space.

   For an NVFS file system, refer to the number of bytes displayed for contiguous free space.

   If the file system on the router is NVFS, compact the memory card to optimize the available free space by selecting Commands > Compact in the Router Files Manager window and clicking on OK in the Confirmation window.

3. **Select File** > **TFTP** > **Put File(s) in the Router Files Manager window.**

The TFTP Put File Selection window opens ([Figure 4-3](#)), invoking the Trivial File Transfer Protocol (TFTP) software to execute file transfers.
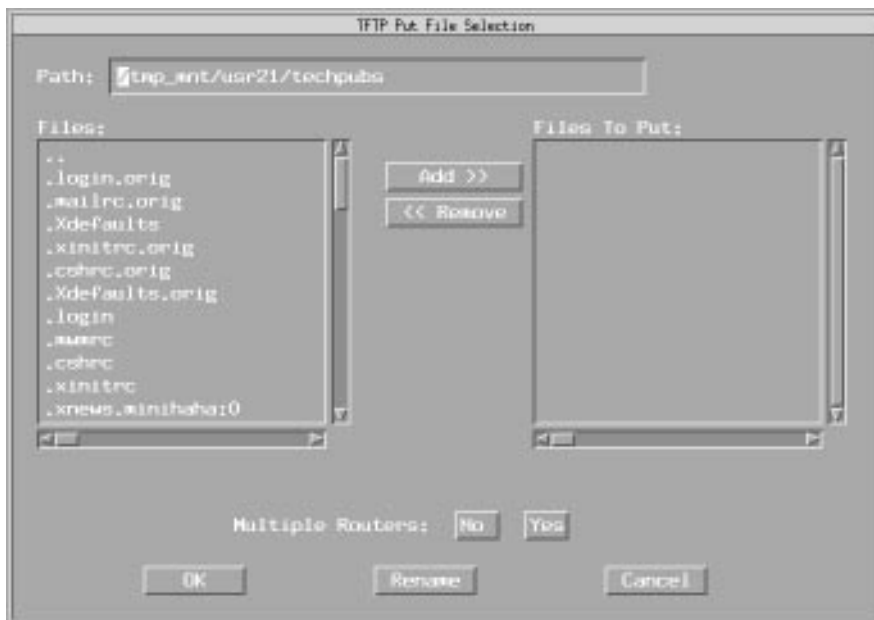
Figure 4-3.   The TFTP Put File Selection Window

4. **In the Path box, enter the pathname of the directory on the Site Manager workstation that contains the image file you want to transfer.**

The filenames in that directory appear in the Files window. You may transfer more than one file at a time, if applicable.

5. **In the Files window, click on the image file you want to transfer to the router. Then click on Add.**

The selected files appear in the Files To Put window.

If you inadvertently add a file that you do not want to transfer to the router, select that file in the Files To Put window and click on Remove.

6. **If you want to send the image file to only one router, click on No in the Multiple Routers field.**

   The Router Files Manager transfers the selected image file to the router to which you are currently connected.

   Refer to *Managing Routers and BNX Platforms* for more information on transferring files to multiple routers.

7. **Click on OK.**

   During the file transfer operation, the Router Files Manager displays a message indicating the name of the image file currently being transferred, and the address of the router that is receiving the image file. When the file transfer completes successfully, the TFTP Put File Selection window closes and you return to the Router Files Manager window.

   If the file transfer fails, check your setup for the TFTP operation. Then try to transfer the file again.

   If you need assistance, call the Bay Networks Technical Response Center.

Note: If you cannot transfer the customized image to the router successfully, do not reboot the router. On single Flash card systems, the router fails to boot because there is no image available from which it can boot.

Chapter 5
Completing the Upgrade:
Upgrading PROMs and Configuration Files

This chapter describes how to

- Upgrade PROMs in a router

- Boot the router with the customized image

- Upgrade configuration files

- Upgrade Frame Relay circuits (optional)

- Transfer script files to the router

Task 1: Upgrading PROMs in a Router

The router's programmable read-only memory (PROM) contains software images for its bootstrap and diagnostic code. Bootstrap and diagnostic PROM code is included on the Router Software Version 11.0 release media.

This section explains

- Whether you need to upgrade Boot and Diagnostic PROMs ("Determining Whether to Upgrade PROMs in a Router")

- The methods for upgrading PROMs in various routers ("Methods for Upgrading PROMs")

- How to upgrade and verify PROMs ("Upgrading and Verifying PROMs")

- How to upgrade PROMs remotely ("Upgrading PROMs in a Router from a Remote Site")

Determining Whether to Upgrade PROMs in a Router

This section describes when and why you should upgrade Boot and Diagnostic PROMs in routers.

Why You Upgrade Boot PROMs

You upgrade Boot PROMs in a router for the following reasons:

- You want to implement a Version 8.10 or later software or hardware feature that depends on the availability of the Version 8.10 or later Boot PROM image. For example, if you want to implement Flash partitioning for your AN router, you must upgrade the Boot PROM image, *anboot.exe*, in that router to Version 8.10 or later.

  Refer to Appendix A for the list of features that require a Version 8.10 or later Boot PROM image.

- You want to implement the new router software image-naming convention, which uses the following router-specific image names introduced in Router Software Version 8.10 (Table 5-1).

Table 5-1.   Router-specific Image Names

Router	Image Name	Description
AN	*an.exe*	Bootable image for the AN
AFN (Flash)	*afn.exe*	Bootable image for the AFN
ASN	*asn.exe*	Bootable image for the ASN
BCN, BLN, BLN-2, BNX	*bn.exe*	Bootable image for the BCN, BLN, BLN-2, and BNX

➡ **Note:** CN, FN, LN, and ALN (VME) routers continue to use the router software image name ace.out.

To implement the new naming convention, upgrade the Boot PROMs on all routers, except the FN, ALN, LN, and CN. The Boot PROM is located on PROM or Flash PROM on each processor board. Once upgraded, Version 8.10 and later Boot PROMs look only for the new router software image name at boot time.

In addition, Version 8.10 and later Boot PROMs for AN and AFN routers are backward-compatible. That is, the Boot PROM looks first for a Version 8.10 or later router software image name (*an.exe* or *afn.exe*, depending on the router) at boot time. If the Version 8.10 or later AN or AFN Boot PROM cannot find the router-specific image name, it searches next for the Version 7-8.*xx* image name, *boot.exe.*

Why You Upgrade Diagnostic PROMs

You upgrade Diagnostic PROMs in routers when the diagnostic image version number for the new release of the router software is higher than the diagnostic image version number for the router software currently installed on your router.

To determine the current version of the Diagnostic or Boot PROM in your router, go to "Determining the Current PROM Version."

Determining the Current PROM Version

You can use Site Manager or the Technician Interface to determine the current version of Boot and Diagnostic PROM images currently running in your router.

Note: A label affixed to the back panel of some routers indicates the installed version of Boot and Diagnostic PROMs. For example, an AN router with a SIMM-based Flash file system has a label that indicates the current PROM version number. See the guide contained in the PROM upgrade kit (*Installing Boot and Diagnostic PROMs in an AN Router*) for more information.

Using Site Manager

To obtain PROM version information from any router currently connected to your Site Manager PC or UNIX workstation:

1. **In the main Site Manager window (refer to Figure 3-1), select Tools > Statistics Manager.**

   The Statistics Manager window opens.

   The Statistics Manager displays the current router's configuration. That is, it displays the circuit type and location of the router's network interfaces and the bridging and routing protocols that are enabled on each interface.

2. **Select Tools > Quick Get.**

   The Quick Get Facility window opens, showing the objects in the Management Information Base (MIB). Use the browser window to scroll through and select objects from the MIB. Then use Quick Get to get all instances of the object you select and to display that information in columns in the Quick Get Facility window.

3. **Scroll through the MIB Browser window and select the top-level object group,** wfHardwareConfig**.**

   The MIB displays subordinate object groups pertaining to router hardware configuration.

4. **Click on the object group** wfHwTable**.**

5. **Continue selecting object groups and descending through the tree until the MIB Browser displays the object** wfHwBootPromRev **or** wfHwDiagPromRev **(depending on which PROM version you want to verify).**

6. **Select the object** wfHwBootPromRev **or** wfHwDiagPromRev.

   The Object Information field at the top right of the Quick Get window displays information about the object.

7. **Click on Retrieve Request in the Quick Get window.**

   All router slots (indicated by the Instance ID field in the Quick Get data retrieval window) and the Boot PROM version associated with each slot appear.

The format for the Boot PROM revision that appears in the output window is eight hexadecimal numerals in a 32-bit display. The first four characters are major revisions; the last four are minor revisions.

Convert the hexadecimal numerals to decimal to determine the PROM revision level. For example, the PROM image version number returned for the Version 9.*xx* router software is 0x00090000.

➡ **Note:** Slots that have a System Resource Module (SRM) do not show a corresponding Boot PROM revision number.

---

8. **Exit the Quick Get Facility window when you are done by clicking on Done.**

   For more information about using the Quick Get, refer to *Managing Routers and BNX Platforms.*

Using the Technician Interface

To determine the version number of PROM images residing in a router while working from a local console, a Telnet session, or a modem, enter the following commands at the Technician Interface prompt:

1. **To obtain the version number of Boot PROM images residing in a router, enter**

   get wfHwEntry.19.*

With a BLN router, for example, information similar to the following appears, with one `wfHwEntry.wfHwBootPromSource` line for each slot.

```
wfHwEntry.wfHwBootPromSource.1 = (nil)
wfHwEntry.wfHwBootPromSource.2 = "rel/8.10/freboot.exe"
wfHwEntry.wfHwBootPromSource.3 = "rel/8.10/freboot.exe"
wfHwEntry.wfHwBootPromSource.4 = "rel/8.10/freboot.exe"
wfHwEntry.wfHwBootPromSource.5 = "rel/8.10/freboot.exe"
```

Each line of response to the command specifies

- A slot number (for example, "wfHwEntry.wfHwBootPromSource.**2**" identifies Slot 2).

- A pathname that contains the version number of the image stored in the Boot PROM (for example, "rel/8.10/freboot.exe" identifies the version 8.10 Boot PROM image *freboot.exe* in Slot 2).

Note: The command does not return a Boot PROM version number for Slot 1 because Slot 1 contains a System Resource Module (SRM). This applies to all routers except AN and ASN routers.

---

2. **To obtain the version number of Diagnostic PROM images residing in a router, enter**

   get wfHwEntry.16.*

With a BLN router, for example, information similar to the following appears, with one wfHwEntry.wfHwDiagPromSource line for each slot:

```
wfHwEntry.wfHwDiagPromSource.2 =
"/harpdiag.rel/v5.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.3 =
"/harpdiag.rel/v5.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.4 =
"/harpdiag.rel/v5.00/wf.pj/harpoon.ss/image.p/frediag.exe"
wfHwEntry.wfHwDiagPromSource.5 =
"/harpdiag.rel/v5.00/wf.pj/harpoon.ss/image.p/frediag.exe"
```

Each line of response to the command specifies

- A slot number (for example, "wfHwEntry.wfHwDiagPromSource.**2**" identifies Slot 2).

- A pathname that contains the version number of the image stored in a diagnostics PROM (for example,
  "/harpdiag.rel/v5.00/wf.pj/harpoon.ss/image.p/frediag.exe" identifies the "v5.00" (Version 5.00) diagnostics PROM image *frediag.exe* in Slot 2).

  Refer to *Using Technician Interface Software* for more information.

See Table 2-3 for Version 11.0 Boot and Diagnostic PROM filenames and associated revision numbers for the various router platforms.

If you determine that you need to upgrade PROMs in your router, continue with the next section, "Methods for Upgrading PROMs."

Methods for Upgrading PROMs

Depending on which router you are upgrading, you upgrade PROMs in that router in the following ways:

- By reprogramming the PROM components using the Technician Interface. This process of erasing the contents of PROM and transferring new bootstrap and diagnostic images is sometimes called "burning" the PROM.

- By physically replacing the existing PROM with the PROM version shipped with Router Software Version 8.10 or later.

Table 5-2 summarizes the methods for upgrading PROMs in various routers.

Table 5-2.   Methods for Upgrading Boot PROMs in Various Routers

If Router Model Is	PROM Replacement Method Is	Refer to
AFN (Flash)	Physical replacement	*Installing a Flash Memory Upgrade in an Access Feeder Node*
AN or ANH (with motherboard revision level earlier than 14)	Physical replacement	*Installing Boot and Diagnostic PROMs in an AN Router*
AN, ANH, or BayStack AN or ANH (with motherboard Revision 14 or later)	Technician Interface **prom** command	*Installing Boot and Diagnostic PROMs in an AN Router*
ASN or BN (BLN, BLN-2, BCN, ARE)	Technician Interface **prom** command	"Upgrading and Verifying PROMs," in Chapter 5 of this manual
FN, LN, ALN, CN	Technician Interface **prom** command	No Boot PROM upgrade required

> **Caution:** Systems with one-time programmable (OTP) PROMs require component replacements to upgrade the PROM version. These systems include AFNs and ANs with motherboards earlier than Revision 14. AN motherboards Revision 14 and later provide flash-in-place capability; you upgrade these PROMs by downloading new code from the Flash file system.

Depending on your AN or ANH model, you transfer new boot and diagnostic code to PROM using either

- A PCMCIA Flash card (BayStack AN and BayStack ANH)

- SIMM-based Flash memory (AN and ANH models without a PCMCIA slot)

To upgrade the PROMs in a SIMM-based AN router with a motherboard revision lower than 14, you must order a PROM Upgrade Kit (Order No. 109435) to physically replace the PROM components.

Go to "Upgrading and Verifying PROMs."

Upgrading and Verifying PROMs

Bay Networks strongly recommends that you upgrade PROMs in a router to implement the latest software or hardware features before upgrading to a new version of the router software.

You use the **prom** command from the Technician Interface to upgrade and verify the software on the Diagnostic or Boot PROM. This command is restricted to the Manager access level.

When you upgrade PROMs, the system erases the existing PROM and copies the contents of the newer PROM image file to the PROM. When you verify the PROM, the system compares the contents of the new image file to the actual contents of the PROM.

Note: Before upgrading any router software, however, make sure that you save a copy of the original configuration file and boot image as a safeguard in case you encounter problems after upgrading.

To upgrade and verify PROMs:

1. **Verify the contiguous free space available on the Flash card.**

    Ensure that the Flash card contains sufficient contiguous free space to accommodate the PROM images you are updating and the latest router image file.

    To determine the amount of contiguous free space, display the directory of the Flash card by entering the following command from the Technician Interface prompt:

    dir *<volume_no.>***:**

    <volume_no.> is the slot number in which the Flash card resides.

    If you need more contiguous free space for the PROM image:

    a. **Delete unnecessary or obsolete files.**

    b. **Compact the contents of the Flash card.**

        From the Router Files Manager, select Commands > Compact.

    While the compact operation is in progress, a display of the percentage of the operation that has been completed appears next to the Volume field in the Router Files Manager window. The router is unavailable for any other file system requests until it completes the compact procedure.

    When the compact operation is completed, the Router Files Manager automatically displays the list of files stored in the Flash card.

2. **Transfer the PROM image files (for example,** *freboot.exe* **and** *frediag.exe***) to the Flash card.**

    The files are located in the Site Manager workstation directory that contains the router software.

    From Site Manager, select Router Files Manager TFTP > Put File. Refer to *Managing Routers and BNX Platforms* for information on using the TFTP Put File option.

From the Technician Interface, use the **tftp** command. Refer to *Using Technician Interface Software* for more information.

3. **Establish a Technician Interface session with the router.**

   Enter the following command at the Technician Interface prompt:

   Manager

   Refer to *Using Technician Interface Software* if you need more information on how to open a Technician Interface session with the router.

4. **Update the Boot PROM by entering:**

   prom   -w *<volume_no.>*:*<Boot_PROM_source_file>* *<slot_ID >*

   <volume_no.> is the slot number of the Boot PROM source file located on a volume; *<Boot_PROM_source file>* is the name of the Boot PROM source file (for example, *freboot.exe*); and *<slot_ID>* is the slot location of the Boot PROM that you want to update.

   For example:

   prom   -w   2:freboot.exe 3

   This command erases the Boot PROM on Slot 3 and copies the contents of the *freboot.exe* file on Volume 2 to the PROM on Slot 3.

   The BN router now has the new Boot PROM file, which invokes only the router software image name *bn.exe*.

Note: Once you enter the **prom** command, it must run to completion. The control-c (abort) command is disabled for the duration of the **prom** command execution to allow it to run to completion. Updating takes from 2 to 10 minutes per PROM. Verifying takes up to 2 minutes per PROM.

---

5. **Update the Diagnostic PROM by entering:**

   prom -w *<volume_no.>* *<Diag_PROM_source_file>* *<slot_ID>*

   <volume_no> is the slot number of the Diagnostic PROM source file located on a volume; *<Diag_PROM_source file>* is the name of the diagnostic PROM source file (for example, *frediag.exe*); and *<slot_ID>* is the slot location of the diagnostic PROM file you want to update.

For example:

prom -w 2:frediag.exe 3

This command erases the Diagnostics PROM on Slot 3 and copies the contents of the *freboot.exe* file on Volume 2 to the PROM on Slot 3.

6. **Upgrade PROMs on multiple slots on your router.**

   If you need to update PROMs on multiple slots, use a dash to indicate a range of slots (2-5), or use commas or spaces to separate multiple slot locations (2, 3, 4, or 2 3 4).

   For example:

   prom   -w 2:frediag.exe 2, 3, 4, 5

   This command erases the diagnostic PROMs on Slots 2, 3, 4, and 5 and copies the contents of the *frediag.exe* file on Volume 2 to the PROMs on Slots 2, 3, 4, and 5.

➡️ **Note:** Boot PROM incompatibilities can exist if you have different Boot PROM revisions on different slots on your router. For example, the Boot PROM image in a slot running Boot PROM Version 8.00 will look for *boot.exe*. A Boot PROM image running Version 8.10 on a BN router will look for the image name *bn.exe*.

   For more information about updating PROMs on multiple slots, refer to *Using Technician Interface Software*.

7. **Verify the PROM upgrade by entering the following command:**

   prom -v *<volume_no.> <Diag_PROM_source_file> <slot_ID>*

   For example, for a boot PROM, enter

   prom -v *<volume_no.>***: [freboot.exe │ asnboot.exe │ anboot.exe]** *<slot_ID>*

   For a diagnostics PROM, enter

   prom -v *<volume_no.>***: [frediag.exe │ asndiag.exe │ andiag.exe]** *<slot_ID>*

   The system verifies that the PROM image on a designated flash volume (that is, the image file used as a source for upgrading the PROM) matches the image actually stored in the boot or diagnostics PROM, on a designated slot.

When you use the **-v** option, the console displays one of the following messages after the verification terminates:

```
prom: slot <slot ID> completed successfully
```

```
prom: PROM data does not match file data on slot <slot ID>
```

If the operation succeeds, the new images stored in the Boot and Diagnostic PROMs run when you reboot the router.

If the operation fails, the console displays a message describing the cause of the failure.

For additional examples of using the **prom** command to update and verify PROMs, refer to *Using the Technician Interface Software*.

Upgrading PROMs in a Router from a Remote Site

This section summarizes the procedure for upgrading PROMs in a router that is located in a remote site. Be sure to read the special considerations in this section before upgrading router PROMs remotely.

Caution: If the PROM upgrade process is interrupted, the router could be disabled.

When upgrading PROMs in a router from a remote site, follow these guidelines to ensure that the PROM upgrade is successful:

• Store the PROM executable files (for example, *frediag.ex*e and *freboot.exe*) on a Flash card that resides on the slot in the system that you use the least.

• Perform the upgrade during non-peak hours to ensure a minimum traffic load across all rails of the backplane (PPX).

  The operations involved in updating PROMs are both data transfer and CPU intensive, as are the regular functions of routing and forwarding normal data traffic. Because periods of high traffic (peak periods) may cause time-outs or other failures of the PROM upgrade process, it is important to perform PROM upgrades during off-peak periods. A failure during a PROM upgrade makes it necessary to repeat the procedure.

• On multislot systems, upgrade the PROM for each slot separately. Attempting to upgrade multiple slots at the same time increases the load on the router backplane.

Caution: Never reset or reboot a router while upgrading PROMs. Should a failure occur, restart the procedure immediately.

Task 2: Booting the Router with the Customized Image

After you transfer the customized image to the router successfully and upgrade PROMs, you can boot the router with the customized image. This activates the customized image on your router.

If you are booting an ASN router for the first time from a Version 11.0 image, the boot time may be longer. After the ASN boots successfully from its Version 11.0 image, you can shorten the boot interval by changing the default Netboot settings. Enter the following commands at the Technician Interface prompt:

bconfig image local
bconfig config local

This results in the ASN booting exclusively from the local image and a local configuration file.

To boot the router with the customized image:

1. **In the Site Manager window, select Administration > Boot Router.**

   The Boot Router window opens (<u>Figure 5-1</u>). It shows a default router volume for the Boot image file (*ace.out*) and the default configuration filename (*config*).
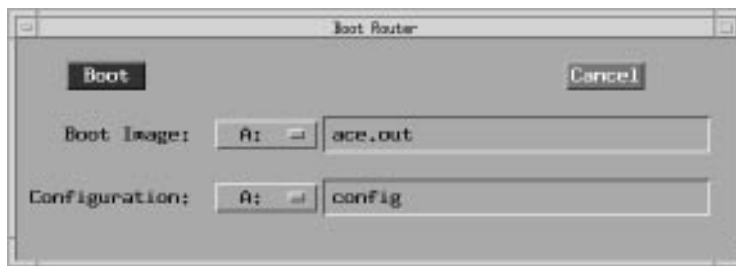
Figure 5-1.   Boot Router Window

---

2. **Select the correct router volume.**

Note: If the router you want to upgrade has only one Flash card, do not change the volumes displayed.

---

a. **Click on the rectangle next to the Boot Image volume number and the Configuration slot number.**

A pop-up window displays the available router volumes containing the router software image and the available slots containing the configuration file.

b. **Click on the number of the slot you want your router to boot or configure from.**

The pop-up window closes and the new slot number appears.

3. **Verify the name of the new router software boot image.**

By default, the router-specific image name appears in the Boot Image box.

Note: If you are upgrading a router that is running Version 8.10, 9.*xx*, or 10.0 Boot PROMs to Version 11.0 and that router contains multiple Flash cards, remove the Version 8.10, 9.*xx, or* 10.0 backup Flash card from the router. Otherwise, when you reset or cold-boot the router, the router will run different versions of the router software on different slots.

---

4. **Verify the configuration file from which you want to boot the router.**

By default, the configuration filename *config* appears in the Configuration box.

5. **Click on Boot.**

A boot confirmation window appears.

6. **Click on OK.**

The router boots using the router software image and the configuration file you specified.

Wait a few minutes to give the router time to boot. The boot time may be longer if you are booting an ASN router for the first time from a Version 11.0 image.

7. Verify that the router booted successfully with the customized image.

Select View > Refresh Display from the main Site Manager window.

If the router booted successfully, Site Manager establishes a connection to the router and displays system information (such as the system name, contact, location, description, and MIB version). This confirms that the router can boot with the customized image.

If the router did not boot successfully, consider the following:

- If you have a router with one Flash card, use a local console to reboot the router from the Technician Interface. If this operation fails, call the Bay Networks Technical Response Center in your area.

- If your router has multiple Flash cards, boot off the original Flash card (pre-Version 11.0). Follow the instructions in "Preparing a Router with Multiple Flash Cards."

Task 3: Upgrading Configuration Files

This section describes how to upgrade your existing Version 7-10.*xx* configuration files to support the new Version 11.0 features. Optionally, you can create new Version 11.0 configuration files to replace your existing configuration files for the router.

You upgrade your existing Version 7-10.*xx* configuration files using the Configuration Manager by booting the router with the Version 7-10.*xx* configuration file, saving the configuration file with a new filename in dynamic mode, and rebooting the router with the new configuration file.

Booting the 7-10.*xx* Configuration File

To upgrade a Version 7-10.*xx* configuration file to Version 11.0, boot it on a router running a Version 11.0 router software image. This router software loads the configuration file currently in the router's memory and updates the configuration file's MIB stamp to match the Version 11.0 router software. It does not, however, automatically save that version to the file on the Flash card.

Saving the Configuration File in Dynamic Mode

After you boot the router with the Version 7-10.*xx* configuration file, save the configuration file with a new filename as follows:

1. **Select Tools > Configuration Manager > Dynamic in the Site Manager window.**

   The Configuration Manager window appears (Figure 5-2), displaying the realtime router hardware and software configuration.
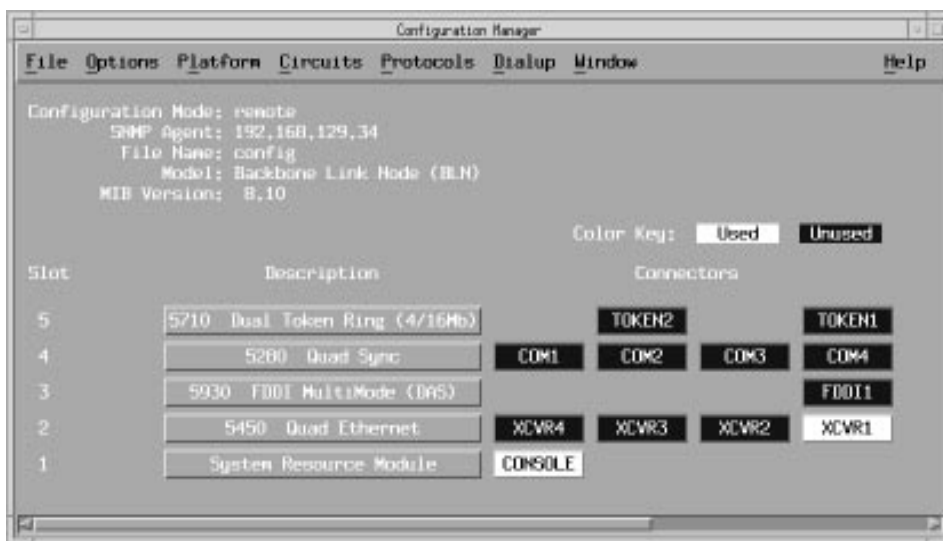
Figure 5-2.   Configuration Manager Window

2. **Select File > Save As in the Configuration Manager window.**

   The Save Configuration File window appears (Figure 5-3.)

Figure 5-3.   Save Configuration File Window

3. **Enter a new filename to save the configuration file on the router, using the following format:**

   *filename***.cfg**

   where *filename* is the name you are assigning this file, and **.cfg** specifies the file type. For example, enter the filename, *config1100*. Do not use the filename *config*.

4. **If the file system on the router is an NVFS, and the volume (slot location of the memory card on the router) that appears in the Volume box is not the volume to which you want to save this file, click on the Volume box and select an alternate volume. Otherwise, go to the next step.**

5. **Click on Save.**

   The File Saved pop-up window appears, prompting you to confirm your decision to save the file.

6. **Click on OK in the File Saved pop-up window.**

   This rewrites the configuration file, *config1100*, in the router's memory and saves it to the Flash card with the Version 11.0 MIB stamp.

Rebooting a Router with a New Configuration File

After you save the new configuration file (*config1100*) to the router, you implement the configuration by rebooting the router with that file.

1. **Select Administration > Boot Router.**

   The Boot Router window opens ([Figure 5-4](#)), displaying default filenames for the router software image and the configuration file. The default volume is the first available memory access card (indicated by slot number) on a router with a non-volatile file system (NVFS), or Volume A on a router with DOS file system.
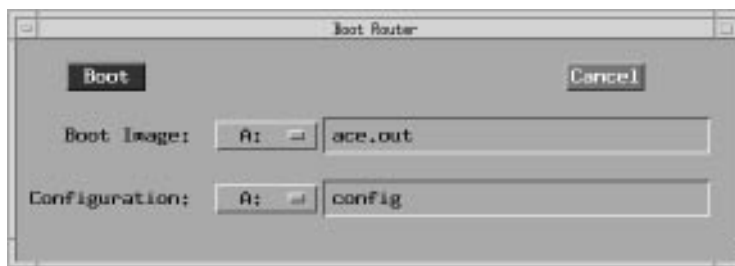
Figure 5-4.   Boot Router Window

Replace the default configuration filename in the Configuration box with the Version 11.0 configuration file, *config1100,* you just saved.

2. **Click on Boot.**

   The router boots with the Version 11.0 configuration file, *config1100*.

3. **Verify that your router is up and running.**

4. **Rename the original configuration file to** *config.bck***.**

   This creates a backup of the original configuration file, which you may need in case the router does not boot successfully with the Version 11.0 configuration file (*config1100*).

5. **Rename the Version 11.0 configuration,** *config1100***, to the default configuration filename,** *config***.**

   This ensures that the router will boot off the correct configuration file, in case the router experiences a power failure.

After you successfully boot the router with a configuration file, it routes and bridges traffic.

Repeat Steps 1 through 5 if you want to upgrade another configuration file. Make sure you give the other configuration file a name other than *config* (for example, *config1100_new.*)

Task 4: Upgrading Frame Relay Circuits

If you are running a version of router software earlier than 7.60 and the configuration file you upgraded in Task 3 had Frame Relay circuits, complete this task. Otherwise, go to Task 5: "Transferring Script Files to the Router."

The upgrade procedure does not convert all Frame Relay circuit records, and Site Manager does not display them. You must delete all interfaces on which Frame Relay was configured and reconfigure the interfaces, as follows:

1. **Open your most up-to-date configuration file, using the Configuration Manager.**

2. **Choose Delete Circuits from the Circuits menu.**

   The Circuit List window displays the circuits.

3. **Select each circuit on which Frame Relay was configured in the configuration file you just upgraded.**

4. **Select Delete.**

   The system removes the selected circuit.

5. **Select Done.**

6. **Choose Add Circuit from the Circuits menu and configure a new Frame Relay circuit for each circuit you deleted.**

Task 5: Transferring Script Files to the Router

Transfer from your Site Manager PC or UNIX workstation to the router any Version 11.0 Technician Interface scripts useful for your router configuration. These scripts let you manage the router using information stored in the Management Information Base (MIB). You can use the scripts to display information about protocols and network services and to enable and disable protocols, circuits, lines, and services.

Technician Interface Script Descriptions

The Technician Interface scripts are *.bat* and *.mnu* files; you must transfer these files to a memory card in each router you want to upgrade to Version 11.0.

- *.bat* files enable you to generate information about a protocol or service that the router supports.

- *.mnu* files enable you to display this information from menus.

Each script contains subcommands to support the options that it provides. For a complete list of script files and definitions, refer to *Using Technician Interface Scripts*.

For each router you want to upgrade to Version 11.0, you must transfer a minimum set of scripts, regardless of which protocol-specific scripts you want to run on your router. Table 5-3 lists these scripts.

Table 5-3.   Minimum Set of Scripts to Transfer to a Router

Script Filename	Description
show.bat	Helps you isolate problems such as circuits that are not working, packets that are not being forwarded, and so forth.
setpath.bat	Sets the search path and aliases for the script commands.
menu.bat	Provides a menu from which you can select the script you want to run.
main.mnu	Displays a top-level menu from which you can select other *.bat* files currently on the system.
monitor.bat	Displays the same information as the **show** command, but refreshes the display periodically so you can examine trends and changes.

In addition to the required script files listed in Table 5-3, you can transfer to your router any protocol-specific scripts to support the protocols on the router you are upgrading to Version 11.0. For example, if you want to run only IP and Frame Relay on a router, transfer to that router the following script files*: ip.mnu*, *fr.bat*, and *fr.mnu*.

Transferring Script Files

Before you transfer script files, do the following:

1. **Compact the Flash card on your router.**

   Select Command > Compact from the Router Files Manager window in Site Manager. This give you more free space on a Flash card.

2. **Check the size of the scripts you want to transfer to your router.**

   Verify that the amount of contiguous free space you have on a Flash card in your router exceeds the size of the scripts to be transferred.

We recommend that you use the Bay Networks implementation of the File Transfer Protocol (FTP) to load scripts on a router from your workstation, because FTP enables you to load more than one file at a time. For information on how to load scripts, refer to *Using Technician Interface Scripts.*

Appendix A
Router Integration Examples

Read this appendix for examples on how to upgrade routers from Version 7-10.*xx* to Version 11.0. Look for an example that applies to the router integration problem you want to solve.

Upgrading Routers from Version 7-10.*xx* to Version 11.0

This section contains examples that show you how to

- Upgrade a Version 8.*xx*-10.0 AN or ANH router to Version 11.0.

- Netboot a Version 7-9.*xx* AN router to Version 11.0

Example 1: Upgrading an AN, ANH, or BayStack AN or ANH Router from Version 8.*xx*-10.0 to Version 11.0

To upgrade a Version 8.*xx*-10.0 AN/ANH or BayStack AN/ANH router to Version 11.0 of the router software:

1. **Verify the version of the Boot PROM currently in the router.**

    Refer to "Determining the Current PROM Version" in Chapter 5 of this manual.

2. **From the Technician Interface, delete the existing** *an.exe* **image from the Flash SIMM (for either the AN or ANH router).**

    For example, if the existing *an.exe* image you want to delete resides on Slot 1 in your router, enter the following command:

    delete 1:an.exe

3. **Compact the Flash SIMM (or Flash card for a BayStack AN or ANH) that contained the earlier router software image (*an.exe*) that you just deleted. (Compaction takes approximately 12 minutes.)**

   For example, if the image file you want to delete is on Volume 1, enter the following command:

   compact 1

   Make sure that you do not interrupt the compact process or the Flash card or Flash SIMM will be corrupted.

4. **Copy your customized Version 11.0 router software image *an.exe* and related files to the AN or ANH router.**

5. **Boot the AN, ANH, or BayStack AN/ANH router from your Version 11.0 software image and a configuration file.**

Use this same procedure (Steps 1 through 5) to upgrade ASN and BN routers, with the following exceptions:

- You must specify the correct image name for ASN and BN routers (*bn.exe* for BN routers and *asn.exe* for ASN routers).

- You compact a Flash card when upgrading BN and ASN routers, not a Flash SIMM.

Example 2: Using Netboot to Upgrade a Version 7-9.*xx* AN Router to Version 10.0

This example explains how to Netboot a Version 10.0 AN router if you have Netboot configured.

Netbooting a Version 11.0 AN Router with Netboot Configured

Netbooting the software image allows you to manage your image and configuration files from a remote location by storing them on the BOOTP server. It also minimizes the need to maintain the router's local file system.

To Netboot a Version 7-9.*xx* AN router to Version 11.0:

1. **Upgrade Site Manager to Version 4.0.**

    See Chapter 3 of this manual for instructions on upgrading to Site Manager Version 4.0.

2. **Start Site Manager.**

3. **Copy the Version 10.0 router software image (*an.exe*) and related files to your PC or workstation.**

4. **From the Site Manager main window, select Tools > Image Builder to start Image Builder.**

    The Image Builder window opens.

5. **Select File > Open from the Image Builder window.**

6. **Select the directory and name of the image file (*an.exe*) you want to open. This is the same file you copied in Step 3.**

7. **Click on OK.**

    The system automatically creates a directory called *.builder_dir* and two subdirectories: one whose name matches the version number of the current router software release, and one whose name matches your router's software image name. For example:

    wf/builder_dir/rel1100/an

    The */an* directory contains all the executable files, including the boot file *krnl_an.exe*.

8. **Copy the file named *krnl_an.exe* and any other protocol executable files that you have configured for the AN to the BOOTP server.**

    Ensure that you have set up the *bootptab* file on your UNIX workstation correctly. For information on setting up the *bootptab* file, refer to *Connecting BayStack AN and ANH Systems to a Network.*

9. **Boot the AN router.**

    The AN will retrieve the new 11.0 router software image from the BOOTP server.

Features Associated with PROM Upgrades

Table A-1 describes router features implemented between Versions 7.70 and 9.*xx* that require a new version of Boot PROM. Upgrade the Boot PROM if the features you need depend on a Boot PROM version more recent than the version now in your router.

→ **Note:** The Boot PROM version that appears in the AFN MIB corresponds to the version of the AFN Diagnostics PROM code. (The AFN has a combined Boot/Diagnostic PROM device.)

Table A-1.   Boot PROM Upgrades for New Feature Support

Router Model	Boot PROM Version	PROM Filename	PROM Features	If PROM Version Is at This Version	Reason for Upgrading PROM
AN/ANH	8.00	*anboot.exe*	4-MB Flash capability.	Upgrade to PROM Version 9.00.	2-MB Flash might be too small to accommodate Version 10.0 image.
	8.10	*anboot.exe*	New router-specific Boot image name (*an.exe*).	No action required.	No new features beyond Version 8.10.
	9.00	*anboot.exe*	None.	No action required.	No new features beyond Version 8.10.
ASN	8.00	*asnboot.exe*	4-MB Flash capability.	Upgrade to PROM Version 10.0	2-MB Flash might be too small to accommodate Version 10.0 image.
	8.10	*asnboot.exe*	New router-specific Boot image name (*asn.exe*). Support for Hot-Swap SPX network module.	No action needed.	No new features beyond Version 8.10.
	9.00	*asnboot.exe*	None.	No action.	No new features beyond Version 8.10.

(continued)

Table A-1.   Boot PROM Upgrades for New Feature Support *(continued)*

Router Model	Boot PROM Version	PROM Filename	PROM Features	If PROM Version Is at This Version	Reason for Upgrading PROM
BN	7.70/7.71	*freboot.exe*	Support for FRE-2 controller.	Upgrade to PROM Version 9.00.	4-MB Flash capability; changed to router-specific boot image name.
	8.00	*freboot.exe*	4-MB Flash capability.	Upgrade to PROM Version 8.10.	2-MB Flash might be too small to accommodate Version 10.0 image.
	8.10	*freboot.exe*	New router-specific Boot image name (*bn.exe*).	No action required.	No new features beyond Version 8.10.
	9.01	*areboot.ppc*	ARE/ATM-specific feature.	No action required.	Not applicable.
VME	8.00	*vmeboot.exe*	4-MB Flash capability.	Upgrade to PROM Version 8.10.	2-MB Flash might be too small to accommodate Version 10.0 image.
	8.11	*vmeboot.exe*	None.	No action needed.	Support for Quad Token Board.
AFN (Flash)	3.03	No filename	Support for 4-MB Flash capability.	Upgrade to PROM Version 8.10.	2-MB Flash might be too small to accommodate Version 10.0 image.
	3.04	No filename	New router-specific image name change.	No action required.	No new features beyond Version 3.04.
ARE s5000	A0000	*are.boot.ppc*	Support for 5780	No action required.	No action required.

Appendix B
Configuration-specific Issues
Affecting Router Upgrades

This appendix describes the Version 7–10.*xx* to 11.0 configuration-specific issues that may concern you, depending on the current configuration of your Version 7-10.*xx* router. Read this appendix if you are upgrading routers in an environment that includes any of the following situations:

- X.25 Configurations

- Standard Point-to-Point Connections

- Switched Services

- PPP Multiline Circuits

Verifying X.25 Certification Requirements

Due to possible differences between older and newer link modules supporting connections to your X.25 network, you must verify that the router you need to upgrade to Router Software Version 11.0 can pass X.25 certification requirements.

➡ **Note:** If the router you want to upgrade is a model AN or ASN, or if the router does not support any X.25 configurations, go to the next section that applies to your environment or to Chapter 3 to begin the upgrade process.

Configuring FN, AFN, ALN, CN, or BN Routers to Run X.25

If you are configuring an FN, AFN, ALN, CN, or BN router to support any X.25 configurations, follow the instructions in Table B-1.

Table B-1.   Configuring FN, AFN, ALN, CN, or BN Routers to Run X.25

Router Software Version	Action
Version 7.60 or earlier	The behavior of the serial controller chips on link modules differs slightly from the X.25 standard, making them noncertifiable in X.25 networks.
Version 7.60 or later	The MK Thompson 5025 serial controller chip in the link modules now performs the LAPB function of X.25. This change significantly improves performance. However, you may still need to replace some link modules that have earlier versions of the MK5025 chip set to ensure that the router passes X.25 certification.

Ensuring that Link Modules Pass X.25 Certification

Follow these guidelines to ensure that you are using a link module that can pass X.25 certification:

- Do not upgrade AFN hardware.

- Do not replace link modules delivered after June 1992.

- Upgrade link modules directly attached to the X.25 network that were delivered before October 1991.

- Inspect only the link modules directly attached to the X.25 network that were delivered between October 1991 and June 1992. Determine which modules to replace by removing the link module from the router and reading the revision level of any MK5025 chip on that module. If the revision level is C03 or later, do not replace.

➡ **Note:** If you need hardware to upgrade your router for X.25 support, contact your Bay Networks representative to order it. Specify that the router needs this hardware to satisfy X.25 certification requirements.

Reviewing Standard Point-to-Point Connection Guidelines

If the router you want to upgrade has no synchronous, point-to-point connection requirements, go to the next section that applies to your environment or to Chapter 3 to begin the upgrade process. Otherwise, read this section.

Configuring Point-to-Point Connections over Synchronous Lines

If you need to configure any point-to-point connections over synchronous lines, you must designate at both ends of the line an HDLC local address and a remote address. The router at each end receives packets at the designated local address and sends packets to the remote (destination) address.

For each of these parameters, the Configuration Manager allows you to do one of the following:

*   Set an implicit address value of DCE (which the router recognizes as a value of 0x01) or DTE (which is 0x03).

*   Set an explicit address value of 0x02, 0x04, 0x05, 0x06, or 0x07.

Whatever local-remote address pair you assign at one end of a point-to-point synchronous line, you reverse at the opposite end of the line. For example, the synchronous circuit on Router A in Figure B-1 has an explicit local address (LA) value of 0x04 and a remote (destination) address (RA) of 0x05. In this case, you configure the synchronous circuit on Router B at the opposite end of the same line with a local address value of 0x05 and a remote address value of 0x04.
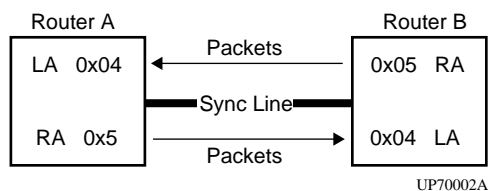
Figure B-1.   Address Assignments on a Point-to-Point Synchronous Line

Setting Explicit Local and Remote Address Values with the Technician Interface

If the Configuration Manager constraints prove impractical due to the requirements of your existing network configuration, you can set explicit local and remote address values by entering the following commands at the Technician Interface prompt of the Version 11.0 router:

s wfSyncEntry.wfSyncLocalAddress.*<slot>.<connector> <integer value>;* **commit**

s wfSyncEntry.wfSyncRemoteAddress.*<slot>.<connector> <integer value>***; commit**

save config *<config filename>*

<slot>.<connector> is the slot and connector (that is, the synchronous circuit) you want to configure.

<integer value> is the explicit address value in the range 0x00 to 0x99, excluding 0x01 (the DCE setting) and 0x03 (the DTE setting).

Reviewing Switched Services Enhancements and Compatibility Issues Affecting Router Upgrades

This section describes how Version 11.0 Switched Services enhancements and compatibility issues affect the Version 7-10.*xx* to 11.0 upgrade process.

Upgrading Dial Services to Use PAP and CHAP for Caller Resolution

Bay Networks has completed its migration of dial services, which began in Version 8.10, from address-based caller resolution – *whoami (*who-am-I) – to authentication-based caller resolution.

Thus, when you use dial services (Dial-on-Demand, Dial Backup, Bandwidth-on-Demand) over any public switched network, such as an Integrated Services Digital Network (ISDN), you no longer can use an address-based method (IP or IPX addresses) to identify a peer router. Instead, you must configure your router to use one of the PPP authentication protocols: Challenge Handshake Authentication Protocol (CHAP) or Password Authentication Protocol (PAP).

PPP uses CHAP names and PAP IDs to identify the caller and to determine which circuit to bring up. You enter CHAP names or PAP IDs in a caller resolution table and associate each name or ID with a demand, primary, or bandwidth-on-demand circuit.

PAP requires the peer router to send a PAP packet that contains a plain-text user identifier and password to the originating router before the interface can advance to the network-layer protocol phase. For more information about PAP and CHAP, refer to *Configuring PPP Services*.

Table B-2 lists the methods used to identify a peer router, beginning with Router Software Version 7.60.

Table B-2.   Caller Resolution Methods

Router Version	Caller Resolution Mechanism
Version 7.60-8.00	Router used PPP NCP address information to identify a peer router.
Version 8.10	Router used either PPP NCP address information or CHAP name to identify a peer router.
Versions 9.00, 10.0, and 11.0	Router uses CHAP name or PAP ID information to identify a peer router.

Upgrading Dial-on-Demand or Dial Backup Circuits

If you have a Version 7.*xx*-8.00 router that uses Dial-on-Demand or Dial Backup circuits and that initiates calls, and you want to upgrade that router to Router Software Version 11.0, the receiving router must be running Router Software Version 8.10 or later. Otherwise, there is no mechanism by which the receiving router can identify the caller.

If you have multiple routers running Router Software Version 8.10 that use Dial-on-Demand or Dial Backup circuits, and you want to upgrade a router to Router Software Version 11.0, then you can upgrade the router on either end of the circuit. However, to ensure that caller resolution completes on the receiving end of the call, you must configure CHAP authentication and caller resolution information for both the caller and the receiver.

PPP Multiline Migration Issues Affecting Router Upgrades

This section describes PPP multiline migration issues and how they affect router upgrades.

Running LCP on All Lines in a Multiline Circuit

Beginning with Router Software Version 9.00, PPP multiline circuits can negotiate and run the Link Control Protocol (LCP) on all lines in a multiline circuit, as opposed to only one line. By negotiating and running LCP on all lines in a multiline circuit, you can

- Detect an initial looped-back condition on any line during LCP negotiation

- Run an Echo Request on any or all lines independently

- Run periodic CHAP authentication on any or all lines independently

- Run Link Quality Reporting (LQR) on any and all lines independently

Ensuring Backward-Compatibility for PPP Multiline Circuits

PPP multiline circuits did not run LCP on all lines of a circuit before Router Software Version 9.00. Therefore, Version 9.00 and later PPP multiline circuits and pre-Version 9.00 multiline circuits are incompatible.

Appendix C
Upgrading the DCM Software
Image in AN and ANH Routers

This appendix describes how to upgrade the DCM software image on an AN or ANH router using either Site Manager or the Technician Interface. It also discusses DCM software image and router software compatibility and tells you how to find out what version of DCM you are currently running.

Upgrading the DCM software image on an AN or ANH router involves

- Transferring the DCM software image from CD-ROM to your PC or UNIX workstation by performing the steps outlined in Chapter 3.

- Transferring the DCM software image from your PC or UNIX workstation to the router's Flash card using TFTP.

- Transferring the DCM software image from the router's Flash memory to the DCM's Flash memory using either Site Manager or the Technician Interface

DCM Software Image and Router Software Compatibility

The Version 1.4 DCM software image is backwards-compatible with Router Software Version 9.0x and 10.0x. However, if you plan to run RMON on a Version 11.0 AN or ANH router, you must upgrade the DCM software image to Version 1.4; DCM software image versions earlier than 1.4 cannot be used with Router Software Version 11.0. If you attempt to run RMON on an 11.0 router that has a DCM software image version earlier than Version 1.4, (for example, Version 1.3.0 or 1.3.1), you will get an error message from the RMON Summary application telling you that the router does not support RMON.

Before you attempt to upgrade a router to Version 11.0, we recommend that you first check the DCM software version residing on the Ethernet DCM.

Enter the following command from the Technician Interface to determine the DCM software image version:

[1:1]$ get wfDCMmw.wfDCMAgentImageVersion.0

The Technician Interface generates a message similar to the following:

```
wfDCMmw.wfDCMAgentImageVersion.0 = "V1.4.0"
```

Transferring the DCM Software Image from CD-ROM to your PC or Workstation

Using UNIX/PC file transfer commands, you can transfer the DCM software image (in11_140.obj) from CD-ROM to your PC or UNIX workstation. Refer to Chapter 3 "Loading Router Software onto a PC or UNIX Workstation" for instructions.

Transferring the DCM Software Image from your PC or Workstation to a Router

You use Site Manger to transfer the DCM software image from your PC or UNIX workstation to the router's Flash memory. Refer to Chapter 4, "Task 2: Transferring a Customized Image to the Router" for instructions.

Transferring the DCM Image from the Router's Flash to the DCM Flash

You can transfer the DCM image from the router's Flash memory to the Ethernet DCM's Flash memory using Site Manager or the Technician Interface.

Using Site Manager

To upgrade the DCM software image from the router's Flash memory to the Ethernet DCM Flash memory, follow these steps:

1. **Select Platform > DCM 11.0 and later > Global... > Base Module DCM ([Figure C-1](#).)**

Figure C-1.   Selecting DCMMW Global Configuration Parameters

The Edit Base Module DCM Parameters window opens (Figure C-2.)

Figure C-2.   Edit Base Module DCM Parameters Window

2. **Change the Enable/Disable option to Disable.**

3. **Change the Boot Option from Local to Download**

   This specifies that you want the Ethernet DCM to boot the downloaded DCM image from the Ethernet DCM's Flash memory and not from the router's shared memory.

4. **In the Image Name field, specify the target volume and the filename of the new DCM software image (*in11_140.obj*).**

   For example: **1: in11_140.obj.**

5. **Select the Save option in the Image Save Mode field and click on OK.**

   The Edit Base Module DCM Parameters window closes.

   If you select the No Save option, the Ethernet DCM boots with the new software image, but does not save the image to the Ethernet DCM's Flash memory.

Next, you need to complete Steps 6 through 8 to boot the Ethernet DCM with the new DCM software image. You complete these steps at the Configuration Manager window.

6. **Select Platform > DCM > Global from the Configuration Manager window ([Figure C-1](#).)**

   The Edit DCM Base Module Parameters window opens ([Figure C-2](#).)

7. **Select Enable in the Enable/Disable option and click on OK.**

   This boots the Ethernet DCM board with the new DCM software image that you specified in the Image Name field and saves the new DCM software image in Flash memory, if specified.

8. **Select Local in the Boot Option box.**

   You select the Local option after you have saved the DCM software image to the Ethernet DCM's Flash and you want to boot the Ethernet DCM from its Flash.

Using the Technician Interface

You can upgrade the DCM software image from the router's Flash memory to the Ethernet DCM Flash memory by running the *dcmload.bat* script file from the Technician Interface.

Caution: Running *dcmload.bat* script temporarily disables, then re-enables, the DCM board.

Respond to prompts in the *dcmload.bat* script file as follows:

• When prompted for the image file name, use the form *<volume:filename>*.

• When prompted whether to save the image on the DCM Flash, answer yes (**y**) to overwrite the existing image on the Ethernet DCM Flash with the new image. Answer no (**n**) to use the downloaded image once, but lose it at the next boot.

Sample Display – dcmload.bat

```
        Use this script to download a DCM image from the router's
        Flash to a DCM board.

        When prompted for the image file name, use the form
        <volume:filename>.

        When prompted whether to save the image on the DCM Flash,
        answer yes (y) to overwrite the existing image on the DCM
        Flash with the new image. Answer no (n) to use the downloaded
        image once, but lose it at the next boot.
```

Specify DCM image name (volume:filename): **1:in11_140.obj**

Do you want DCM to save this image on its FLASH? (y/n) [y]: **y**

Image Name is 1:dcmboot.exe
Image will be saved by DCM in its FLASH

Do you want to start the download process? (y/n) [y]: **y**
Downloading of DCM image has started. It will take few seconds to complete

Appendix D
Upgrading Router Software
Using Quick2Config

This appendix provides guidelines for upgrading your existing AN, ASN, or ANH router to Router Software Version 11.0 using Quick2Config™. We assume that you have knowledge of basic Quick2Config operations.

For detailed information about installing and using Quick2Config, refer to *Installing the Quick2Config Tool* and *Configuring Your Router Using the Quick2Config Tool.*

Perform these steps:

1. **Copy the router software image file (***asn.exe*** or ***an.exe)*** from the CD to your PC.**

2. **Start the Quick2Config application.**

   To learn how to start Quick2Config from Windows 95 or from Windows 3.1*x*, refer to *Configuring Your Router Using the Quick2Config Tool*.

3. **Select the Connect to a router on the network option (default) from the Starting Quick2Config Session Dialog Box.**

4. **Click on OK.**

   If the IP address for the router displays in the connection list, select it. Otherwise, enter the router's IP address in the IP address box.

5. **Transfer the existing** *an.exe* **or** *asn.exe* **image from the router to the PC.**

   a. **Select File > Router File Manager.**

      The Router File Manager window opens.

   b. **Select the** *an.exe* **or** *asn.exe* **image file name and the volume on which the image file resides.**

      If there are multiple volumes on the router, select the correct volume.

   c. **Select File > Get from Router > TFTP from the Router Files Manager window.**

      This ensures that you have a backup of the existing image if you need it.

6. **Remove the existing router software image from your router.**

   With the *an.exe* or *asn.exe* image file still selected (highlighted), select File > Delete from the Router File Manager window.

   The Delete File Dialog Box appears. Click on OK to delete the file.

7. **Compact the contents of the Flash card.**

   Select File > Compact from the Router File Manager window.

   Make sure that you select the same volume from which you just deleted the *an.exe* or *asn.exe* image file.

   You compact the Flash card to ensure that the Flash card contains enough contiguous free space to accommodate the new Version 11.0 software image.

8. **Transfer the Version 11.0** *an.exe* **or** *asn.exe* **image file from the PC to the router's Flash card.**

   Select File > Send to Router > TFTP from the Router File Manager window.

   Be sure to transfer the new Version 11.0 software image to the same volume from which you removed the previous one.

9. **Close the Router File Manager.**

   Select File > Exit.

10. **Boot the router with the new Version 11.0 image** (*an.exe or asn.exe*)**.**

    Quick2Config boots the router using the specified router software image and configuration file.

    Refer to *Configuring Your Router Using the Quick2Config Tool* for detailed instructions on booting a router using Quick2Config.

Glossary

ace.out   Router software image containing executable files used to boot FN, LN, ALN, AFN with diskette, and CN routers.

afn.exe   Router software image containing executable files used to boot an AFN router.

an.exe   Router software image containing executable files used to boot an AN or ANH router.

asn.exe   Router software image containing executable files used to boot an ASN router.

bn.exe   Router software image containing executable files used to boot a BN router.

booting   The process in which a device obtains information and begins to process it to attain a state of normal operation.

BOOTP   Bootstrap Protocol, a TCP/IP network protocol that lets network nodes request startup and configuration information from a BOOTP server node.

config   Network configuration file containing proprietary protocol services code.

Directed Netboot   Bay Networks procedure for getting router startup files from a TFTP server on the IP network.

DLCMI   Data Link Control Management Interface. Specification for the use of Frame Relay products that defines a method of exchanging status information between devices.

DOS   The primary disk operating system used by IBM and compatible personal computers.

driver   A hardware device or program that controls or regulates another device.

dynamic   The ability of a display or view to change as a result of ongoing network activity.

Ethernet	Type of network cabling and signaling that operates at the data link layer of the OSI model.
Flash Memory	Removable Personal Computer Memory Card International Association (PCMCIA) standard memory card. The ASN uses a Flash memory card to provide storage for its nonvolatile file system (NVFS), called the *local file system.*
Frame Relay	Standard, connection-oriented protocol for use between data terminal equipment and data communications equipment. Frame Relay complies with the ANSI Annex D and LMI Frame Relay management specifications, along with the CCITT (now ITU-T) Annex A specification.
freboot.exe	Copy of the bootstrap image resident on the Boot PROM for the BCN and BLN router.
frediag.exe	Copy of the diagnostic image resident on the Diagnostic PROM for the BCN and BLN.
HDLC	High-Level Data Link Control, a protocol that provides error correction at the data link layer.
image	One or more executable files used to boot a router; for example, *asn.exe*.
IP	The Internet Protocol defined in RFC 791.
Local Boot	Bay Networks procedure for getting router startup files from the file system stored in local Flash memory.
MB	Megabytes.
MIB	Management Information Base. A standard or proprietary database that contains network configuration parameters and statistics.
modem	A modulator-demodulator, a device that converts digital signals used by computers to analog signals that can be transmitted over telephone lines, and vice versa.
MS-DOS	Microsoft Disk Operating System. A version of DOS used by computers that are compatible with IBM personal computers.
multicast packets	Targeted broadcast packets sent to a defined group.
Netboot	Bay Networks procedure for getting router startup files from a BOOTP server on the IP network.

node	On local area networks, a device that is connected to the network and is capable of communicating with other network devices.
packet	A unit of data sent across a network.
Ping	A program that is useful for testing and debugging networks. Ping sends an echo packet to the specified host and waits for a response. It then reports success or failure and statistics about its operation.
PPP	Point-to-Point Protocol, a protocol that provides a way of running IP over serial lines. It uses a variation of HDLC.
router	A device that connects two or more networks and can direct traffic based on network resource availability.
Site Manager	Bay Networks network management application. It is an SNMP-based graphical user interface used by network administrators to manage Bay Networks routers.
SNMP	Simple Network Management Protocol, a network management protocol on TCP/IP networks.
stack	A group of drivers that work together to span the layers in the network protocol hierarchy.
Telnet	Internet standard protocol for remote terminal connection service. Telnet is described in RFC 854.
Technician Interface	A software command-line interface, operating in router memory, that administrators use to manage Bay Networks routers.
TFTP	Trivial File Transfer Protocol. A protocol that enables file sharing over TCP/IP networks.
Windows	Microsoft Windows, the graphical user interface on which the router software runs.
WinSock	Windows Sockets. An application programming interface (API) support for IP environments.

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